DOCUMENT RESUME

ED 121 922 UD 015 983

TITLE Evaluation of the ESEA Title I program of the Public Schools of the District of Columbia, 1974-75. Final Evaluation Report.
INSTITUTION IBEX, Inc., Durham, N.C.; Littlejohn (Roy) Associates, Inc., Washington, D.C.
SPONS AGENCY District of Columbia Public Schools, Washington, D.C. Dept. of Research and Evaluation.
PUB DATE [75]
NOTE 91p.

EDRS PRICE MF-$0.83 HC-$4.67 Plus Postage
DESCRIPTORS *Annual Reports; Elementary Secondary Education; Learning Laboratories; Nonpublic School Aid; Program Administration; *Program Evaluation; Remedial Instruction; Special Education; *Student Characteristics; Summer Programs; Teacher Influence; Vocational Development
IDENTIFIERS *District of Columbia; Elementary Secondary Education Act Title I; ESEA Title I

ABSTRACT

The target population served by the FY. 1975 Elementary Secondary Education Act Title I Program included approximately 17,000 public elementary and secondary school chilren in the first second, third and seventh grades. In the eligible nonpublic schools, approximately 800 students were eligible in grades one through eight. The total learning concept was implemented through the Total Learning Center Program in all designed Title I public schools. In 1974-75, there were four elements in the program: the Competitive Partnership Program, the Affective Component, the Enrichment Experiences Program, and the Summer Program. During the regular school year, the students from private schools identified for the 1974-75 nonpublic school program were served at their own schools by reading and mathematics resource teachers and educational aides. In the summer a Total Learning Center Program operated for six weeks. A learning center approach in five elementary centers was used to provide a variety of learning settings for special education children. The Title I Comprehensive Program operated three career development projects. Two community schools housed centers for homework, remedial assistance, and informal education. For young children, the national Follow Through program for children in the primary grades was conducted at two schools. (Author/JM)

Documents acquired by ERIC include many informal unpublished materials not available from other sources. ERIC makes every effort to obtain the best copy available. Nevertheless, items of marginal reproducibility are often encountered and this affects the quality of the microfiche and hardcopy reproductions ERIC makes available via the ERIC Document Reproduction Service (EDRS). EDRS is not responsible for the quality of the original document. Reproductions supplied by EDRS are the best that can be made from the original.

ED121922

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

EVALUATION OF THE ESEA TITLE I PROGRAM OF THE PUBLIC SCHOOLS OF THE DISTRICT OF COLUMBIA

1974-75

FINAL EVALUATION REPORT

SUBMITTED TO:
DIVISION OF RESEARCH AND EVALUATION
THE PUBLIC SCHOOLS OF
THE DISTRICT OF COLUMBIA
WASHINGTON, D.C.
(UNDER CONTRACT NO. NS 0623-AA-NS-N-5-GA)

PREPARED BY:
(JOINT VENTURE)
IBEX, INCORPORATED AND
ROY LITTLEJOHN ASSOCIATES, INC.

UD 015 983

ACKNOWLEDGEMENTS

The authors would like to express their appreciation to Mrs. Anne W. Pitts, Executive Director of the Title I Project, Dr. Mildred Cooper, Assistant Superintendent for Research and Evaluation, Mrs. June Bland, Assistant for Evaluation, Earl L. Hunter, Coordinator Title I Evaluation, Division of Research and Evaluation, and their staffs who have provided numerous suggestions and considerable support throughout the evaluation activities.

Special thanks are extended to the principals, teachers, aides, nonteaching professionals, and parents who gave of their time to complete evaluation instruments and who offered constructive ideas for the improvement of the program.

The authors also wish to acknowledge the efforts of Dr. William G. Katzenmeyer and Dr. Mabel Sterling for their assistance in instrument development; Mr. Troy Weaver and Mr. Lloyd Wise for coordinating the collection of evaluation data; Mr. B. Steven Davis for his assistance in managing the project, and Ms. Pauline Matson and Ms. Nancy Mercer for typing and assembling the final report.

A. Jackson Stenner
Vice President
IBEX, Incorporated

Helmuts A. Feifs
President
IBEX, Incorporated

Ed Smith-Green
Vice President
Roy Littlejohn Associates, Inc.

CONTENTS

PART I

CHAPTER I. EXECUTIVE SUMMARY 3
CHAPTER II. IMPLICATIONS AND RECOMMENDATIONS 7
CHAPTER III. PROGRAM DESCRIPTION 9
CHAPTER IV. EVALUATION DESIGN SUMMARY 13

PART II

CHAPTER V. A PROFILE OF THE TITLE I CHILD 19
CHAPTER VI. STUDENT READING AND MATH ACHIEVEMENT 27
CHAPTER VII. PIAGETIAN CONSERVATION ASSESSMENT 43
CHAPTER VIII. BIRTH CHARACTERISTICS AND STUDENT PERFORMANCE 49
CHAPTER IX. COMPONENTS OF SUCCESS 53
CHAPTER X. INSTRUCTIONAL PROCESS ANALYSIS 55
CHAPTER XI. COMPETITIVE PARTNERSHIP COMPARISONS 61
CHAPTER XII. ADMINISTRATION AND SUPPORT SERVICES 81
CHAPTER XIII. NONPUBLIC SCHOOLS 89

PART I

CHAPTER I. EXECUTIVE SUMMARY

Title I of the Elementary and Secondary Education Act of 1965 (Title I ESEA) authorizes grants to public education agencies to meet the special educational needs of children living in low income areas or in institutions for the handicapped, neglected, or delinquent. Children of migrant workers and American Indian children attending federal schools may also be served through programs established through Title I funding. Programs must provide educational and support services which are supplemental to the regular program offered by the public education agency, and payments are made to state educational agencies for grants to local education agencies.

During the planning cycle for fiscal year 1975 the most acute program need identified by Title I program staff of the District of Columbia Public Schools was that of raising the achievement levels of identified Title I pupils in both reading and mathematics. Additional needs identified as basic, but varying in intensity from school to school were:

(1) To help Title I students develop a positive concept of themselves and their ability to achieve academic success;

(2) to assist Title I teachers in improving their skill in the diagnostic-prescriptive approach to individual pupil needs in reading and mathematics;

(3) to actively involve parents and other interested citizens in the decision making process of the instructional program and the local school and central office level;

(4) to provide supportive counseling and guidance to students in the areas of health, economic need, absenteeism, and domestic problems as they affect educational growth and development.

The needs assessment and the findings of educational research upon which the national program is based were used to develop a "total learning" concept which provides for a saturated learning environment of diagnostic-prescriptive teaching and interest-centered instruction. Priorities of need were then established to implement total learning centers. It was felt that the critical areas of need were at the primary level and at the transition to junior high school for those students from the most economically disadvantaged school attendance areas.

The target population served by the FY 1975 program was approximately 17,000 public elementary and secondary school children in the first, second, third, and seventh grades who reside in the public school districts selected for Title I participation and who were identified as (1) achieving at or below the 50th percentile of the Washington, D.C. students in their grade for either reading or mathematics, or (2) repeating the grade, or (3) two years older than their normal age for grade. Kindergarten pupils were identified on the basis of a standard preschool inventory. In the eligible nonpublic schools approximately 800 students were identified in grades 1 through 8.

Title I children possess a unique set of characteristics which differentiate them from non-Title I children. These characteristics cut across a broad spectrum of behaviors and social considerations and, taken together, place the Title I child "at risk." Several of the characteristics which differentiate Title I and non-Title I children are as follows: Non-Title I children are twice as likely as Title I children to have had preschool experience; withdrawn behavior is three to five times more prevalent in the Title I population; aggressive behavior is about twice as prevalent in the Title I population; Title I first graders are three times as likely to have repeated kindergarten or first grade; classroom participation is much less frequent in Title I children; non-Title I children are considerably more likely to have a family supportive of their school efforts than are Title I children; Title I children show more economic need than non-Title I children from the same attendance areas; communications problems interfering with educational progress are two to three times more prevalent in the Title I group; Title I students are three to four times more likely to require referral to Pupil Personnel Services; and physical and health problems are two to three times as prevalent in the Title I population as in the non-Title I population. Without question, Title I students are characterized by a cluster, or constellation, of problems. This fact makes intervention more difficult in that multiple interacting problems require multiple interacting interventions if any progress is to be made.

The Title I program is registering a clear and substantial impact in reading and mathematics at the primary grades. Reading and mathematics gain scores at the second and third grade levels are considerably above one month's growth for each month's instruction indicating that Title I students at these grade levels are reducing the achievement deficit. The seventh grade gain scores are substantially below the norm of one month's gain for one month's instruction. To a certain extent, the low gain scores at the seventh grade level can be explained by the fact that approximately one-third of the seventh graders showed no gain whatsoever, indicating that these students are being tested above their reading level and, consequently, are scoring at or below chance. This problem can be solved by instituting a practice of testing students on their functioning level rather than on their grade level.

A well recognized pattern in Title I children's achievement profiles is that the longer the child is in school the farther behind he becomes. One explanation for this finding is that at each successive grade more and more of the learning demands understanding of relationships (relation eduction) and less and less of the material can be learned by rote (associative memorization.) Thus we see the dilemma facing the Title I child. He wants the approval and recognition which accompany successful performance (which usually means the correct answer); however, he is incapable of grasping the relationships necessary to an understanding of the material so he does what all of us do when faced with a similar dilemma, he begins the slow associative process of acquiring what appears (to the child) to be unrelated bits of knowledge in the form of stimulus response chains varying in complexity. The double bind is now set because the child gradually develops an associative style or habit which is not only of limited effectiveness when the child lacks the relation eduction ability to grasp a particular relationship, but becomes a dominant response tendency even in those problem situations in which the child's relation eduction ability is clearly adequate for the task. Deficits in Title I children's achievement may reflect their unsuccessful attempts to respond associatively to material which is so rich and complex that the associative process is increasingly unequal to the task. If this explanation is substantiated it has specific implications for the scope and sequence of elementary school curriculum.

It is a fact that some children achieve more in the Washington, D.C. Title I program than do other children. An analysis was conducted to identify the differences between students who are high achievers in the Title I program and students who are low achievers. One difference that stood out as highly important was "extent of family support of school efforts." Likewise, students who "voluntarily participate in classroom activities," have "low economic needs," and are free of behavior problems tend to be the high achievers. Unfortunately, at this time we do not know whether high achievement causes increased participation in classroom activities or whether increased participation causes high achievement.

The gain score distributions provide some insight into the grade levels at which children are achieving the most. At the second grade level fully 50% of the Title I students show better than one month's growth in Total Reading for one month's instruction (i.e., between nine and ten months' growth in Total Reading). At the third grade level the point at which 50% achieve more and 50% achieve less (median) is seven months. As might be expected, the non-Title I median is higher with the second and third grade medians being eleven months and ten months respectively.

The median Total Math gain score for Title I second graders is nine months, for third graders is nine months, and for seventh graders is seven months. Thus the cumulative difference observed in the reading gains is not so apparent in mathematics and, in fact, has been essentially arrested at the second and third grade levels. The non-Title I second graders show a median gain of nine months and, surprisingly, there is little difference between the Title I and non-Title I second grade distributions; however, third grade gains for non-Title I students are markedly higher with the median gain being eleven months.

Children from the ages of 1 through 7 usually are classified in the Piagetian preoperational stage during which their thinking focuses on appearances and considers single, concrete aspects of a situation only. Conceptual skills develop only after age 5, during the intuitive phase of preoperational development. This phase is identified by the attainment of conservation (the ability to recognize that perceptual changes in objects do not disrupt their basic attributes.) For example, a conserving child will say that the amount of clay in a ball which he has watched being flattened into a disc is unchanged but a nonconserver will say that the disc has more clay than the ball had. Nonconserving children lack the conceptual background which they need to assimilate their experiences in school and thus may suffer academically. This evaluation found substantial, consistent relationships between conservation ability and achievement in reading and mathematics.

Typically, children acquire conservation abilities spontaneously, *i.e.*, there is no direct instruction or teaching of conservation concepts. The spontaneous acquisition of conservation concepts is one manifestation of developing relation eduction capacity. It seems highly likely that there is a minimum level of relation eduction ability required for any learning activity. For example, the concept of "regrouping" in mathematics (subsumes the operations of borrowing and carrying) normally presented in the latter half of the second grade requires an understanding of several relationships before mastery and understanding can be attained. A second grader can be taught the mechanics of "regrouping" and can thus solve addition and subtraction problems requiring this operation without an understanding of the place value relationship which is critical in the "regrouping" concept. Recent research suggests that if children cannot conserve then they cannot educe (draw out or understand) the relationships involved in regrouping. If teachers persist in teaching nonconserving children the "regrouping" concept, the children will, after repeated presentations, master the mechanics but they will have no understanding of the "why" of the mechanical procedure they perform. Other concepts which first, second and third graders are expected to learn require varying amounts of relation eduction ability. If any of these concepts are repeatedly presented to nonconserving children they will respond associatively and, when possible, memorize the mechanics which lead to the correct answer. Such mechanics do not transfer to different applications, are easily forgotten, and, like any mechanical repetitive process, are inherently nonmotivating.

Following a review of recent research into the effects of low birth weight on children's school performance, a carefully designed study of a selected sample of low birth weight children was initiated. An unforeseen difficulty arose when the birth records for 75% of the sample were missing from the Public Health files. As a result, the findings reported here are only suggestive and should be viewed as preliminary, pending replication. The findings suggest that children with birth weights below five pounds have striking deficiencies in reading and mathematics and acquire conservation skills at a later age than full birth weight children. If we might indulge some conjecture and assume that this study sample is representative, several rather staggering implications are apparent. For example, if the 14% estimate (see text for rationale) is accurate, then there are almost 3,000 K-3 students in Title I eligible schools with birth weights below five pounds.

Two questions need to be answered before some of the above conjecture can be translated into a logical analysis of the implications. First, how many children in the Washington, D.C. Schools are low weight at birth (<5 lbs.)? Second, what are the behavioral concomitants of low birth weight? With these two questions answered an analysis is possible of the implications of various intervention strategies. One conclusion is inescapeable: If low birth weight is a prevalent condition, and if the cognitive deficiencies which accompany low birth weight are as substantial as past research suggests, then multiple agency intervention strategies are absolutely essential.

The Competitive Partnership (CP) program is a joint school/industry effort to test the effectiveness of various publishers' programs with Title I students. Publishers of reading and mathematics programs were asked to submit proposals to the schools. The schools reviewed the publisher's programs and proposals and selected the programs of four publishers in reading and mathematics. This evaluation covers the third and last year of the CP program and presents a synthesis of the three years' findings. In brief, "D.C. Heath's poor showing in the third grade is an overriding factor in the recommendation to retain only the McGraw-Hill and Random House reading programs. A second alternative is to place a heavier investment in Random House in grades one and three, and in McGraw-Hill in grades one and two . . . The results show little to commend one mathematics program over another. As indicated earlier, in grades two and three all programs achieved grade equivalent gain scores of eight months or higher."

The nonpublic school achievement gain scores are consistently at or above the large city norm of one month's gain for one month's instruction. Total Reading gain scores tend to be higher on the average than Total Math gain scores, with gains in Total Reading being as high in the upper grades as in the lower grades.

The failure in this evaluation to isolate the teacher strategies that predict student achievement replicates numerous other studies which have, likewise, failed to uncover significant relationships between teacher characteristics and student achievement. However, the fact is unavoidable that some children achieve more in the Washington, D.C., Title I program than other children, and the question remains, why? What are the components of success? From an analysis of student achievement, Piagetian conservation, and birth characteristics, we can glimpse some insight into a partial answer. An explanation as to why certain children succeed and others do not requires going back to the circumstances surrounding a child's birth. As we have previously noted, low birth weight seems to be a primary contributor to later scholastic and behavioral problems. Likewise, children unable to conserve are at risk in that their relation eduction abilities are not mature enough for them to easily grasp normal first or second grade material. Failure, as judged by their teachers, peers, and themselves, contributes to fundamental feelings of inferiority and insecurity. Behavioral problems develop as responses to repeated failure and these behavioral problems, in turn, inhibit learning and the cycle continues gaining momentum with each additional week of school. The home and the general quality of out-of-school stimulation which the child receives are heavily implicated in this constellation of failure and self doubt. The program emphasis in 1975-76 on self concept development and concept development (e.g., conservation) with concomitant evaluation emphasis on these areas, should increase our understanding of the causes behind the success enjoyed by some children and the failure suffered by others. An answer to the "why?" question has plagued educators for decades; the solution will not unfold in one brilliant flash of insight but, rather, will accumulate slowly as our understanding of children's growth and development increases.

CHAPTER II. IMPLICATIONS AND RECOMMENDATIONS

The purpose of an evaluation is to provide information to individuals at various levels within the management structure and to individuals and agencies outside the structure. An adequately conceived and implemented evaluation should yield constructive recommendations which can be used in program planning. Based upon the information on the characteristics of Title I students, the type of program being offered, and the outcomes of the present program, the following recommendations are presented:

1. Low reading or math achievement is only one factor in a constellation of characteristics which differentiate Title I from non-Title I children. Health problems, language differences, limited family support, classroom behavior problems and low self concept all contribute to these children's difficulties. Emphasis should be given to defining, more broadly, the needs of Title I children and in concert with this recognition of multiple needs should come the recognition that agencies other than the schools must play an essential role in eliminating these needs.

2. All evidence points to the importance of early intervention. The sooner a child with special needs can be identified and offered special services, the greater the likelihood of reversing the cumulative difference pattern which characterizes Title I children's academic development.

3. That the level of "family support" registers a pervasive impact on a broad range of student outcomes, including achievement and classroom behavior, points up the wisdom in emphasizing parent involvement. It seems likely that family support is the most potent out-of-school contribution to students' performance and, to the extent to which the Title I program can effect a positive increase in this variable, the child should benefit.

4. Withdrawn children are as prevalent in the Title I population as are aggressive children and yet are much less likely to be nominated by their teachers for Pupil Personnel Services than are aggressive children. In fact, the odds are 3 to 1 that an aggressive child will be nominated by his teacher for PPS, while the odds are 9 to 1 that a withdrawn child will not be so nominated. Some serious study needs to be given to this rather dramatic inequity in targeted services.

5. The math achievement results do not support a conclusion that one instructional approach is superior to the others. Judging from the similarity in results across approaches, particularly at the third grade level, a decision based on relative per pupil cost might be the best solution.

6. Because of the importance of the first two years of a child's life in predicting later success and also because of the relationships between adequate nutrition and prenatal care, some consideration should be given to organizing an interagency task force to study the possibility of an early screening system for identifying pregnant mothers in need of nutritional supplements, and identifying three-year-olds with special needs. The present accountability scheme is holding the schools responsible for remediating problems that have their inception early in a child's life. It is simply common sense to introduce intervention as near the time of problem inception as possible.

7. Results from this evaluation suggest that the affective behavior of children, including self concept, is highly related to reading and math achievement. The nature of this relationship deserves exhaustive study in the years ahead.

8. The importance of concept development (e.g., conservation skills) in predicting reading and math achievement has been documented by past research and supported by the conservation and achievement substudy conducted as part of this evaluation. Although a cause-effect relationship has not been demonstrated between conservation skills and achievement, the associational evidence is highly suggestive of such a relationship. Consequently, it is recommended that a small controlled experimental study be initiated to study the question of whether first, it is possible to speed the concept development of young children through specific instructional strategies, and second, whether such development contributes positively to basic skills achievement. A positive outcome from such a study would yield benefits far exceeding the investment involved in conducting such a study.

9. The gain score frequency distributions suggest that as much as twenty percent of the Title I population is being tested far enough beyond their achievement level that they are scoring at or below chance. This difficulty can be eliminated by adopting a policy of "functional level testing" which simply requires that each student be tested with the level appropriate for his or her achievement level.

10. Some clarification is required regarding involvement of the nonpublic schools in the Title I evaluation.

CHAPTER III. PROGRAM DESCRIPTION

Title I of the Elementary and Secondary Education Act of 1965 (Title I ESEA) authorizes grants to public education agencies to meet the special educational needs of children living in low income areas, or in institutions for the handicapped, neglected, or delinquent. Children of migrant workers and American Indian children attending federal schools may also be served through programs established through Title I funding. Programs must provide educational and support services which are supplemental to the regular program offered by the public education agency, and payments are made to state educational agencies for grants to local educational agencies.

A review of the program design, objectives, and rationale was an integral part of the series of initial design conferences for the evaluation of the 1974-75 Title I Comprehensive Program of the Public Schools of the District of Columbia. Representatives of the evaluation contractors and the Title I Program reviewed the program together against the background of federal guidelines, the structure of the public school system, and the recent needs assessment for identified Title I students.

ADMINISTRATIVE STRUCTURE OF THE D.C. SCHOOLS

The administrative structure of the Public Schools of the District of Columbia is unique because of the combined city-state status of the nation's capital. The state and local functions of public education normally found in separate agencies in other states are integrated into one system in Washington, D.C., with one superintendent and one board of education. The school system maintains the state function for Title I grants through the state education agency (SEA) under the Department of Federal Programs and the local function through the local education agency (LEA) within the Division of Instructional Services. The responsibilities of each agency are:

1. The State Education Agency (SEA) is responsible to the Superintendent of Schools, the Board of Education, and the Office of Education for meeting and monitoring all federal requirements, program design, fiscal control, management, and communication. The Coordinator, Title I State Office, is the responsible official.
2. Local Education Agency (LEA) is responsible for the administration of the Title I Comprehensive Program, including program assessment, development, operations, implementation and dissemination, and related programmatic research. The Executive Director administers the total operation of the Title I Comprehensive Program.

NEEDS ASSESSMENT

During the planning cycle for fiscal year 1975, two acute program needs were identified: the raising of achievement levels of identified Title I pupils in both reading and mathematics. In addition, four other needs were identified as basic, but varying in intensity from school to school. They were:

1. To help Title I students develop a positive concept of themselves and their ability to achieve academic success.
2. To assist Title I teachers in improving their skill in the diagnostic-prescriptive approach to individual pupil needs in reading and mathematics.
3. To actively involve parents and other interested citizens in the decision making process of the instructional program and the local school and central office level.
4. To provide supportive counseling and guidance to students in the areas of health, economic need, absenteeism, and domestic problems as they affect educational growth and development.

PROGRAM RATIONALE

The rationale for the implementation of the FY 1975 ESEA Title I program in the District of Columbia has its basis in the national program and the needs assessment for identified Title I students in the District of Columbia. The national program strives to increase the educational achievement level of children from low income communities. The needs survey conducted for the local schools pointed out the gap that exists between achievement of students from low income areas in Washington, D.C., and the national large city norm.

The design of the national program is based upon the educational research findings which indicate that a great many children who grow up in communities comprised of families with low income can be termed "educationally disadvantaged." They lag significantly behind the achievement norm for their age-grade in school. Supplemental educational programs have been successful in decreasing the gap between the norm and the median achievement level of children from low income communities.

Results of nationally normed achievement tests indicate that students enrolled in grades one through three in public schools of the District of Columbia in May, 1973, showed an achievement deficit in reading and mathematics compared to children in other large cities. A grade equivalent deficit of 0 in reading and .1 in mathematics in grade one is contrasted with a deficit of .6 in reading and .2 in mathematics by grade three. In addition to achievement results and other information on the background of the students, age for grade data in low income neighborhoods was used in identifying program needs for FY 1975.

The needs assessment and the findings of educational research upon which the national program is based were used to develop a "total learning" concept which provides for a saturated learning environment of diagnostic-prescriptive teaching and interest-centered instruction. Priorities of need were then established to implement total learning centers. It was felt that the critical areas of need were at the primary level and at the transition to junior high school for those students from the most economically disadvantaged school attendance areas.

PROGRAM GOALS

The Title I program Goals for FY 1975, as stated in the FY 1975 proposal, were:

1. Development of pupil mastery of the basic skills in reading and mathematics.
2. Reinforcement of skill development through a curriculum which integrates reading and mathematics with other school subjects and learning experiences.
3. Exposure of pupils to meaningful musical, dramatic, literary, dance, and other experiences through in- and out-of-school artistic performances, field trips, and pupil participation in the arts.
4. Provision of a multi-ethnic program of carefully planned literary and cultural experiences which expose children to books of their own culture and other cultures and activities. The goal will be for children to realize:
    a. That they do have roots in the past through a cultural heritage of which they can be proud;
    b. That their culture has made important contributions to the total culture of their country and world;
    c. That no one culture has a corner on imagination, creativity, poetic quality or philosophical outlook;
    d. That other cultures have ways of looking at life and expressing ideas which can expand their own understanding.

A series of secondary program goals relates to the needs of program staff in establishing processes and procedures to insure achievement of goals for students:

1. Provision of variety of modalities for instruction in the communication skills, which accommodate the different learning styles of children through:
    a. Verbal language arts (listening, speaking, reading, writing), literature and drama
    b. Symbolic language (mathematics)
    c. Nonverbal arts (music, art, dance)
2. Establishment of a comprehensive program of staff development experiences for resource and classroom teachers of identified Title I students directed toward improving instructional techniques in the areas of communication skills and the nonverbal arts.

PROGRAM DESIGN

The target population served by the FY 1975 program was approximately 17,000 public elementary and secondary school children in the first, second, third, and seventh grades who reside in the public school districts selected for Title I participation and who were identified as (1) achieving at or below the 50th percentile of the Washington, D.C., students in their grade for either reading or mathematics, or (2) repeating the grade, or (3) two years older than their normal age for grade. Kindergarten pupils were identified on the basis of a standard preschool inventory. In the eligible nonpublic schools, approximately 800 students were identified in grades one through eight if they resided in eligible public school districts and met the other criteria for participation.

The Title I program is designed to implement its goals through programs for children and parents and staff development programs. The programs for children are described in this section. Programs for parents and staff development programs are described in other parts of this report.

Programs for Children

The child is considered the center of the Title I program. To emphasize the importance of serving all of the child's educational needs, the 1974-75 program was designed around the total learning concept. To develop the child's cognitive, affective, and social skills, a saturated learning environment was designed to balance diagnostic teaching of needed skills in reading and mathematics with interest-centered instruction and free choice activity.

Total Learning Centers

The total learning concept was implemented through the Total Learning Center Program (TLC) in all designated Title I public schools. In 1974-75 there were four elements in the program: the Competitive Partnership Program, the Affective Component, the Enrichment Experiences Program, and the Summer Program.

For the *Competitive Partnership Program* FY 1975 was the third and final year. Selected publishing companies continued to furnish programmed materials for instruction in reading and mathematics and to provide workshops and consultation to school personnel and parent groups. They were in competition with each other to produce the greatest pupil achievement and in partnership with the school system in providing resources for supplementary instruction to Title I students.

Affective Education balanced instruction in cognitive skills with activities specifically designed to develop positive self concepts and healthy interpersonal relationships. Interaction experiences included story-telling, mathematical games, dramatic play, peer group work sessions, creative writing, sustained silent reading periods for the whole classroom, and experiences outside the classroom.

The *Enrichment Experience Program* expanded the Title I pupils' educational opportunities by enriching their experiential background. Music, drama, the fine arts, black studies and field trip experiences supplemented the basic school program.

The *Total Learning Center Summer Program* operated as a half-day, six-week extension of the regular year. Some students were taught in experimental multilevel classroom situations by a team which included parents.

Nonpublic School Centers

Children from private schools are eligible for Title I services if they are identified as educationally deprived and reside in the public school attendance areas designated as Title I project areas. During the regular school year the students identified for the 1974-75 nonpublic school program were served at their own schools by reading and mathematics resource teachers and educational aides from the public school system in a laboratory setting. In the summer, a Total Learning Center Program operated for six weeks.

Special Education Noncategorical Compensatory Learning Centers

A learning center approach in five elementary centers was used to provide a variety of learning settings for special education children. Some children placed in centers were able to return to regular classrooms on a full-time basis during the year. A special education consultant team supported school personnel in serving children with special education needs in regular classrooms where possible.

Special Projects

The Title I Comprehensive Program operated three career development projects to orient selected students to careers in business and industry. Two community schools, Garnett-Patterson, a junior high school, and Harrison, an elementary school, housed centers for homework, remedial assistance, and informal education. For young children, the national Follow Through program for children in the primary grades was conducted at two schools.

CHAPTER IV. EVALUATION DESIGN SUMMARY

The Washington, D.C. Title I evaluation has been planned in cooperation with the Title I staff and the Division of Research and Evaluation. This chapter outlines the design strategy, major evaluation milestones, instrumentation, evaluation questions, and substudies which comprised the evaluation design.

DESIGN STRATEGY

The conceptual framework employed in this evaluation is the Information Based Evaluation Model (IBE)* which views as the primary task of evaluation supplying information to individuals in decision making roles. The model focuses on evaluation questions and the ways these questions can be answered most usefully for different audiences. Information based evaluation recognizes that an evaluation must be dynamic if it is to be responsive. Program objectives rarely change during the project year; thus, the objectives based evaluation is static and methodical in responding to the information requirements. Information based evaluation accepts the fluidity of information needs and the posing of new questions throughout the program cycle. The IBE Model addresses three primary classes of information and evaluation activity: (1) product (summative) evaluation; (2) process (formative) evaluation, and (3) process/product evaluation. Product evaluation assesses program outcomes; process evaluation monitors strategies and procedures designed to change student or teacher behavior. Process/product evaluation explores the relationship between products and processes and seeks to determine which dimensions of a particular program lead to successful outcomes and how these dimensions can be replicated. Although often ignored, process/product evaluation is programmatically more important than either product or process evaluation. Product evaluation asks how the students or teachers are different after exposure to the new program, and process evaluation asks what strategies differentiate the Title I program from traditional approaches and whether these strategies were implemented. Process/product evaluation asks about the relationship between instructional strategies and the outcomes of the program.

Program Structure Analysis (PSA) is a procedure developed especially to address the problem of identifying the components or characteristics which contribute to a program's success. Stepwise multiple discriminant analysis is used to relate program characteristics (such as teacher knowledge of teaching reading, ratio of Title I to non-Title I students per classroom, particular mathematics curriculum used) to a dichotomous criterion variable representing classrooms with high gain scores in reading (adjusted for pretest contribution) and classrooms with low adjusted gain scores. Information from PSA can be used by program staff to manipulate systematically selected variables which prove significant in predicting achievement gains. Subsequent evaluations can then examine both the direction and magnitude of a process variable's contribution before and after manipulation.

MAJOR MILESTONES

The initial phase of any IBE-based evaluation concentrates on extensive contact with the program staff and other information users. The first formal meeting was held on January 16, 1975. A similar meeting was held on January 20, 1975, with the Division of Research and Evaluation staff. Following these initial meetings, formal "design conferences" were held on January 28, 1975, and February 5, 1975. The product of these conferences was a list of information needs ranked by priority which both Title I staff and Research and Evaluation staff felt were most critical during the 1974-75 school year.

A comprehensive process evaluation battery was presented for approval by the Title I and Research and Evaluation staffs. The battery included measures of teacher attitudes, teacher knowledge

---

*A. Jackson Stenner, *An Overview of Information Based Evaluation: A Design Procedure*, Information Based Evaluation Series Book 1 (Arlington, Virginia: IBEX, Inc., 1972).

of teaching reading, teacher knowledge of teaching mathematics, teacher knowledge of classroom management practices and classroom environment variables. Numerous suggestions for improvement were suggested by the Title I and Research and Evaluation staffs and subsequently were included in the battery.

In early March final plans were made to administer the Piagetian Conservation Assessment Battery, The Student Information Form (machine-readable), and the Teacher Process Battery. On March 18, 1975, a briefing was held for principals of Title I schools. The purpose of the meeting was to inform the principals of the rationale, methods, instruments, and schedule of evaluation activities. A decision was made to abandon, for the 1974-75 evaluation year, plans to use the Self Observation Scales for assessing children's self concept development because appropriate reviews and clearances could not be made in time for administration of the Self Observation Scales in May.

Implementation activities centering around administration of the Teacher Process Battery and the Conservation Assessment Battery required the entire month of April. During this time Roy Littlejohn Associates (RLA) staff teams visited and collected data from over seventy elementary and junior high schools. Considering the scope of the data collection effort, the field work went very well; the vast majority of schools cooperated fully.

In May all major data gathering activities were completed. The major field instruments (Teacher Process Battery, Piagetian Conservation Assessment Battery, Principal Interviews, and the Parent Questionnaires) were prepared for data processing. Negotiations began with the Bureau of Vital Statistics for access to birth certificates of a selected sample of children. In addition, a contract was made with Dr. Isadore Goldberg for work related to the cost-effectiveness analysis.

On June 11, 1975, a meeting was held to present an outline for the final report and to discuss format considerations. A progress report was given on the state of the data analysis, and the importance of obtaining the posttest achievement data was emphasized.

By August, all data had been either scanned or keypunched and placed on computer disc for analysis. A tape was delivered to the Research and Evaluation Division with all the student information forms (20,000+) ready for analysis. The Department of Human Resources, District of Columbia, notified IBEX/RLA that a box of microfiche containing 75 percent of the needed birth characteristics data had been misfiled and, thus, the plans for the birth weight study were severely compromised.

EVALUATION QUESTIONS

The Evaluation Design Document (February, 1975) contains a complete enumeration of the evaluation questions. The following is a list of some major questions given extended treatment in this report.

1. How do the competitive partnership approaches compare in reading and mathematics achievement, relative to cost?
2. How do Title I eligible students compare with non-Title I students in reading and mathematics?
3. What are the strengths and weaknesses in the reading and mathematics achievement subtest profiles for Title I students in grades K, 1, 2, 3, and 7?
4. What student characteristics are most predictive of reading and mathematics achievement (student characteristics: sex, age for grade, years in the Title I program, type of program, preschool experience, size of family, classroom behavior, physical health)?
5. What teacher process dimensions discriminate between classrooms with the lowest adjusted standardized reading achievement test scores and classrooms with the highest adjusted scores?
6. How is the learning environment different across the primary grades serviced by the Title I program?
7. What teacher strengths and weaknesses are indicated by the process evaluation and what inservice activities are suggested?

INSTRUMENTATION

The quality of any evaluation, to large measure, depends on the quality of the instruments that are used to gather the data in the evaluation. The Consortium's approach to evaluation ensured that the instrumentation used was of the highest quality. All Consortium instruments used in the evaluation of the Title I program 1974-75 except the California Achievement Test and the Comprehensive Test of Basic Skills were developed or selected with the working involvement of the Title I staff and Research and Evaluation staffs. Each instrument used in the 1974-75 Title I evaluation is identified and briefly described in the following text. The instruments have been grouped into three categories: student instruments, teacher/administrator instruments, and parent participation instruments.

Student Instruments

The Student Information Form collects information on students including basic demographic data, program data, mobility data, and behavioral characteristics.

The California Achievement Test is a group-administered, standardized test. Form A was administered to first graders, and Form B to second graders. The battery assesses two basic skill areas, reading and mathematics. The reading subtests are: Vocabulary, Reading Comprehension, and Total Reading. Mathematics subtests are: Math Computation, Math Concepts and Problems, and Total Math.

The Comprehensive Test of Basic Skills (*CTBS*) is a group-administered, standardized test. For this evaluation, Form Q, Level 1 was utilized with third graders, and Level 3 with seventh graders. The instrument assesses the student's level of reading and mathematics proficiency. The reading subtests are: Letter Sounds, Word Recognition, and Reading Totals. The mathematics subtests are: Math Concepts, Computation, and Math Totals.

The Conservation Assessment Package (*CAP*) is an individually administered instrument which assesses cognitive development among preschool and early school-age children. The Conservation Assessment Package is based on Jean Piaget's systematic developmental theory of cognitive growth, depicting a stage-by-stage process of a child's thinking. The subtests are: Numbers, Two-dimensional Space, Continuous Quantity, Discontinuous Quantity, and Weight.

Teacher/Administrator Instruments

The teacher instrument utilized is a group-administered instrument designed by IBEX in concert with Title I staff and the staff of the Research and Evaluation Division of D.C. Schools. The evaluation instrument was designed to assess teacher knowledge of reading, mathematics, classroom strategies, professional values, and to provide limited teacher demographic data. The total battery consisted of the following subsections.

The Inservice Attitude Inventory is an instrument which solicits teacher attitudes toward inservice programs as well as his/her suggestions for improving inservice programs.

The Educator's Professional Values Scale is an instrument which solicits teacher attitudes toward statements to which the teacher indicates his/her degree of agreement. The instrument contains the following empirically defined factors: (1) attitude toward student-centered education, (2) subject matter emphasis, (3) teacher-directed versus student-directed classroom orientation, (4) teacher empathy, (5) student-initiated activities, and (6) subject matter integration.

The Teacher Knowledge of Classroom Management is a direct, self report instrument which is intended to assess the way teachers would respond in a series of hypothetical classroom situations. The instrument presents situations with four alternative actions for which the teacher selects the response which is most characteristic of the way he or she would respond.

The Inventory of Teacher Knowledge of Reading is an instrument which was designed to aid in assessing a teacher's understanding of the reading act and strategies used in reading instruction at the primary and junior high levels. The inventory includes multiple choice items sampling seven areas frequently included as content in basic preservice or inservice courses in reading methods. These areas include reading readiness, word perception, comprehension and critical reading, differentiating reading instruction, silent and oral reading, diagnosis and correction, and goals of instruction.

The Inventory of Teacher Knowledge of Math is an instrument designed to assess the understanding of the strategies employed in math instruction at the primary and junior high levels. The inventory includes multiple choice items sampling different areas frequently included as content in basic preservice or inservice courses in mathematics teaching methods.

The Administrator Interview Form is an interview instrument completed by a trained field observer. The instrument was designed to collect basic background data concerning the number of years of experience and educational background of school administrators. The administrators were asked to comment on their feelings concerning the strong and weak points of the Title I program in their school.

Parent Participation Instrument

The Parent Questionnaire is designed to gather basic demographic information concerning parents and their children who are involved in the program. The parents were requested to respond to a series of questions which solicited their attitudes concerning their involvement in the Title I program.

SUBSTUDY OVERVIEWS

Two substudies were designed to address several questions of particular interest. The first study dealt with the sequelae of premature birth. Research has generally indicated an inverse relationship between degree of prematurity and intellectual and educational performance; however, reviewers report conflicting findings regarding degree and duration of poor educational performance. This substudy investigates the relationships between premature birth and educational performance in Title I students, and the findings could have implications for intervention strategies employed with Title I students.

The second substudy examines the relationships between conservation ability and achievement. At about age seven the child usually makes a transition from a preoperational stage of thinking to a concrete operational (logical) stage. The shift is characterized by the internalization of operations which were previously carried out overtly. Through internalizing these operations, a child is usually able to reverse or undo mentally an action or procedure. This substudy investigates the possibility that the ability to conserve is requisite to learning basic reading and mathematical concepts and that attempts to teach young children certain concepts before they can conserve yield less than satisfactory results.

PART II
EVALUATION FINDINGS

CHAPTER V. A PROFILE OF THE CHILD

The purpose of this chapter is to present a multidemensional portrait of the Title I eligible child. That each child is unique is unquestioned, but Title I eligible children share a constellation of characteristics which place them "at risk" immediately upon entry into public schools. It is this shared constellation of factors which is the concern of this discussion; how do these children differ from non-Title I children and what special problems and needs do they share? The Washington, D.C., Title I eligible child has counterparts throughout the nation of varied ethnicity and racial groups. It is therefore helpful to place the specific characteristics of the Washington, D.C., children in the context of a summary of the status of all the nation's economically and educationally disadvantaged children.

On February 19, 1970, the Select Committee on Equal Educational Opportunity of the United States Senate was created "to study the effectiveness of existing laws and policies in assuring equality of educational opportunity, including policies of the United States with regard to segregation on the ground of race, color, or national origin, whatever the form of such segregation, and to examine the extent to which policies are applied uniformly in all regions of the United States." The committee worked for nearly three years, heard 300 witnesses, and compiled over 13,000 pages of testimony. This testimony represents the most extensive review ever undertaken of the quality of current compensatory education programs and, as such, presents a complex panorama of views and opinions. This section attempts to summarize some of the salient points from this testimony and draws heavily on the report of the committee presented to Congress on December 31, 1972.

CHARACTERISTICS OF DISADVANTAGED CHILDREN

Approximately 21 percent of the nation's school children are members of minority groups.* Of the nation's 59 million school age children, 4 million are in families with incomes under $3,000. Nearly 3.2 million public school children and preschool children are in such families. In public schools and preschools, 4.4 percent of the white children, 20.7 percent of the black children, and 25 percent of the Spanish-surnamed school children are in families with less than $3,000 yearly income.

About 4.4 million children, or 6.2 percent, lived in families where the head of the household did not work in 1970. Another 12.1 million were in houses where the breadwinner worked only part of the year. Thus, a total of 16.5 million or 23.2 percent, were in families in which the head was either unemployed or underemployed. Unemployment is not necessarily tragic in and of itself, but it is the products of this predicament that are intolerable. The Senate Select Committee on Nutrition and Human Needs estimates that there are 25.5 million Americans living on incomes insufficient to sustain a nutritionally adequate diet.† About 10.5 million of these Americans are under age 18. Of those who need food assistance and do not receive it, 3.8 million are children. Of the 9.3 million school children eligible for free and reduced-price school meals, 7.5 million receive school lunch and only 520,000 receive school breakfast.

The American Academy of Pediatrics estimates that 18 million children under age 17 may have never seen a physician and that 21 million see a doctor less often than once a year. Some specific indications of the magnitude of this problem are as follows:

> The report of the 1971 White House Conference on Children and Youth notes that about 12 million children need special care for eye conditions; more than 3 million are afflicted with speech impediments; over 2 million have untreated orthopedic handicaps; and 75 percent of all children in families with annual incomes of less than $2,000 and 66 percent in families earning less than $4,000 have never seen a dentist.
>
> The U.S. Department of Health, Education, and Welfare in a survey in the 1960's, reported that among young children age 6-11, one out of 12 had a speech defect, one out of nine had faulty vision, and that among children age 5-14, one in four had never seen a dentist, with poor children having an average of 3.5 decayed, untreated teeth.

---

*Except where otherwise noted, the statistics used in this chapter are derived from U.S. Census Bureau Reports resulting from the 1970 Decennial Census.

†U.S. Senate Select Committee on Nutrition and Human Needs, Committee print, *Hunger in the Classroom: Then and Now* (January, 1972).

Recognizing the high correlation between the quality of the home environment and subsequent educational achievement, this disparity is paramount. Minority group children are from four to seven times more likely to be below the poverty level than are white children.

In addition to money, parents' educational background provides another index of both the home environment and educational advantage or disadvantage. More than 6.5 million, or 11 percent, of all school age children live in families where the head of the household has less than an eighth grade education and 23.2 million, or 39 percent, of all school age children have parents who failed to complete high school. In terms of median years of school completed, the white population over 25 have completed 12.1 years, blacks 9.8 years, and Spanish-speaking Americans 9.6 years. Some statistics highlight the current plight of the Spanish-speaking American: In Chicago, 60 percent of all Puerto Rican students drop out before they finish high school. Of 18,000 Puerto Ricans enrolled in the public school system, just 4,000 are in high schools. In Newark, N.J., out of 7,800 Puerto Rican students, 96 are in the 12th grade. Philadelphia's Puerto Rican dropout rate is 70 percent.

In 1968, it was estimated that 10 percent of the children enrolled in the nation's public schools had moderate to severe emotional problems, and only 5 percent of the children needing psychiatric care received it. One of every three poor children has serious emotional problems that require treatment. As of 1970, over 2.5 million young people under the age of 20 were mentally retarded and between 100,000 - 200,000 babies were born mentally retarded each year.

As a report of the 1971 White House Conference on Children and Youth states:

> These and other health needs are not being met because of inadequate preventive diagnostic and treatment services in low-income areas, particularly in major cities. Children from these areas often enter school without previous medical or dental care. At this time in many outpatient departments, children are waiting 5 to 7 hours to be seen hurriedly by a physician. When health problems are discovered through school examinations, community agencies often lack the resources to provide treatment and follow-up care.

The above statistics indicate both the magnitude and the complexity of the health, food, family education, employment, and income problems of a substantial segment of this nation's school children. The U.S. Office of Education classifies almost 17 million children as disadvantaged. However, the criteria used by U.S.O.E. are somewhat restricted and a better estimate is that between 20 and 30 percent of this nation's children begin school with a low probability of success. These children begin school at a different starting point than their more advantaged counterparts and thus have different educational needs.

Against this broad background, we now turn to a description of the constellation of characteristics that place the Washington D.C. Title I eligible child "at risk." Much of the preceding discussion of the national scene is directly pertinent in describing the Washington, D.C., Title I eligible child; however, more specificity, with focus on the child rather than his environment, will bring additional clarity and richness to our descriptive portrait.

THE WASHINGTON, D.C., TITLE I ELIGIBLE CHILD

In the spring of 1975 each kindergarten through third grade teacher in Title I schools completed a Student Information Form (SIF) for each student in her class. Questions on the SIF dealt with previous history, the child's special deficiencies and needs, classroom behavior, extent of family support, etc. The following discussion examines the differences between Washington, D.C., Title I and non-Title I students at each of grades K-3 and, where applicable, notes sex differences on the selected variables.

Has the student had any preschool experience?

☐ yes ☐ no ☐ don't know

The odds that a Title I kindergarten or first grade child has had preschool experience are even (50-50), while the odds are 2 to 1 in favor of a non-Title I child having had preschool experience. Boys and girls are equally likely to have attended preschool. One hypothesis that must be entertained in the face of these differences is that preschool experience reduces the probability that a child will require Title I services.

Is the student withdrawn to such an extent that it interferes with his educational progress?

☐ yes ☐ some ☐ no

Withdrawn behavior is from three to five times more prevalent in the Title I population. Surprisingly, males and females are equally likely to be nominated for this category by their teachers. The number of children exhibiting at least some withdrawn behavior peaks at twenty-eight percent at the first grade, but levels off at about twenty-two percent during second and third grades.

Is the student aggressive to such an extent that it interferes with his educational progress?

☐ yes ☐ some ☐ no

Aggressive behavior is about twice as prevalent in the Title I population. Not surprisingly males are nominated more frequently for this category than females. The number of nominated Title I males increases from eighteen percent in kindergarten to twenty-eight percent in third grade. Similarly, nine percent of the Title I female kindergarten students are nominated, while sixteen percent of Title I female third graders are nominated. These steady increases may represent one behavioral concomitant of successive years of academic failure.

Has the student repeated one or more grades?
Indicate the grade(s) repeated:

☐	☐	☐	☐	☐	☐	☐	☐	☐
None	1st	2nd	3rd	4th	5th	6th	7th	8th

Title I first graders are three times as likely to have repeated either kindergarten or first grade than are similar non-Title I students (23% of males and 16% of females have repeated at least one grade by the end of first grade). Only 9% of non-Title I males and 3% of non-Title I females repeat either kindergarten or first grade. By third grade the number of repeaters among Title I students doubles with 42% and 31% of the Title I males and females, respectively, repeating at least one grade. By third grade one of every four non-Title I males and one of every seven females have repeated at least one grade.

Does he voluntarily participate in classroom activities?

5 Highest Degree	4	3	2	1 Lowest Degree

Title I students are three times more likely to be represented in the lowest category than are non-Title I students. Males are less likely to volunteer than females, and this holds for both the Title I and non-Title I groups.

To your knowledge, how supportive is his family of his school efforts?

5 Highest Degree	4	3	2	1 Lowest Degree

Title I students are twice as likely as non-Title I students to be in the lowest category of this variable. Likewise, non-Title I students are twice as likely as Title I students to be in the highest category. Family support seems to be more prevalent at the kindergarten level and gradually diminishes through the primary grades. Sex differences are nonexistent.

Is there evidence that economic need interferes with his classroom performance?

☐ yes ☐ no

Title I students are two to three times more likely to evidence economic need that interferes with classroom performance than are non-Title I students. This variable is quite evenly distributed across the grades and sexes with an average of 15% of Title I and 7% of non-title I students being nominated.

To your knowledge, has he any communications problem that interferes with his educational progress (including bilingual)?

☐ yes ☐ no

Communications problems interfering with educational progress are two to three times more likely in the Title I group. Males in the Title I group are almost twice as likely to suffer from this problem, however, males in the non-Title I group are equally likely as non-Title I females to have a communications problem.

Does he have serious behavioral problems requiring referral to the Pupil Personnel Services Department?

☐ yes ☐ no

Title I students are three to four times more likely to require referral to Pupil Personnel Services than non-Title I students. The number requiring referrals almost doubles from kindergarten to first grade and then holds steady at about fifteen percent for males and six percent for females. At third grade, 17% of the Title I males, 6% of the Title I females, 9% of the non-Title I males and 2% of non-Title I females require referral. Approximately 1400 K-3 students are viewed by their teachers as requiring referral to Pupil Personnel Services.

To your knowledge, has he any physical or health problems that interfere with his educational progress (including speech, hearing and vision)?

☐ yes ☐ no

Physical and health problems are two to three times as prevalent in the Title I population as in the non-Title I population. Males are about twice as likely to have physical or health problems, and other than increases at the first grade level, distributions are similar across grades. Over the primary grades, 1550 students have physical problems interfering with their educational progress.

How many days was he absent for any reason during the current school year?

☐ 0-9 ☐ 10-19 ☐ 20-29

☐ 30-39 ☐ 40-89 ☐ 90 +

Title I students have more absences than non-Title I students. Absences decrease as students get older. No sex differences are evident.

Earlier in the discussion it was noted that Title I students are usually characterized by a cluster or constellation of problems. Intervention is thus more difficult in that multiple interacting problems require multiple interacting interventions if any progress is to be made. The myriad of behavioral problems exhibited by the Title I child require the kind of plans made in 1975-76 for increased attention to affective development and highlights the interrelationship between cognitive and affective development. The above findings leave little doubt that the Title I student is indeed "at risk."

In an effort to clarify the specific factors which accompany certain student characteristics, a series of discriminant analyses were run. The intent of these analyses is to bring into focus the fact that Title I children's problems come in multiples and that certain patterns are evident in the ways these problems are related to one another. This analysis deals with first graders because of the increase in problem frequency occurring at this level. Similar analyses were performed at grades, K, 2, 3, and 7 with findings highly similar to those reported for first graders. For the sake of brevity and clarity of presentation, the results for grades K, 2, 3, and 7 have been omitted.

The analytical model (discriminant analysis) used in preparing Table 1 is conceptually quite simple. We began by constructing two groups, students with high family support and students with low family support. We then identified a constellation of variables (e.g., reading level, behavior problems, etc.) which best descriminates between the two a priori groups. Thus, if students with low family support are prone to be poor readers, to be withdrawn or aggressive and to require referral to PPS, then these variables and others which show significant differences between the two "family support" groups are added to the constellation of characteristics (best linear combination) which discriminates the high family support group from the low family support group. An index of how effectively we can discriminate between the two family support groups is provided in the percent of correct classifications. This index gives the percent of students who would be correctly classified into the two groups if all information in the "constellation characteristics" category was known to the person doing the classifying. For example, suppose that fifty children from the low family support group and fifty from the high family support group were mixed up and one was asked to identify the students belonging to each group using only the information provided on the Student Information Forms. The chances are that one would be right in eighty-two of the cases and wrong in only eighteen. Such is the magnitude of the differences between students having a high level of family support and those having less of this support. We can just as easily turn the question around and ask what can be predicted about a child if we know that his family is supportive of his school efforts. The answer is found under the "constellation characteristics" section of Table 1. Thus, students with high family support are more likely to participate in classroom activities, to be better in reading and mathematics, and to be less likely to have behavior problems.

Two findings related to student characteristics require some elaboration. It is particularly noteworthy that in the Title I population withdrawn children were as prevalent as aggressive children and yet were much less likely to be nominated by their teachers for PPS than aggressive children. In fact, the probabilities were 3 to 1 that an aggressive child would be nominated by his teacher for PPS, while the odds were 9 to 1 that a withdrawn child would not be so nominated. Apparently, teachers are more apt to refer those students causing "disturbance in the normal routine" rather than those students most in need. The phrase "squeaky wheels get the oil" is applicable. It seems highly unlikely

Table 1. Summary of Characteristics Associated with Certain First Grade Students' Behavior and Experiences

Student Experience or Behavior Classification	Narrative Presentation of the Student Information Form Characteristics Which Discriminate between Student Experience or Behavior Classifications (characteristics are presented in order of importance in discriminating between the classifications)
Preschool Experience (N = 1298) vs No Preschool Experience (N = 1016)	Students without preschool experience are more at risk than children having had preschool experience. Students having had the benefit of preschool *are less likely to need special Title I services; are more likely to participate in classroom activities; are more likely to have a family supportive of school efforts; are better readers; are better in mathematics; are less withdrawn; and are less likely to repeat a grade.* Clearly, students having had preschool experience are better off than those not having preschool experience, but the question of causality remains unanswered. It has not been established whether preschool reduces the risk for children or whether it just so happens that those children lucky enough to have preschool experiences are the ones who would have "made it" anyway. An examination of these two competing possibilities might yield important information for program planning.
Students Nominated by Their Teachers as Withdrawn (N = 148) vs Those not so Nominated (N = 1788)	Withdrawn students are *less likely to participate in classroom activities; have lower reading scores; have lower math scores; are more likely to be nominated for Title I services; have less family support of their school activities; evidence more economic need; and have more health problems.*
Students Nominated by Their Teachers as Aggressive (N = 136) vs Those not so Nominated (N = 1946)	Aggressive students *are likely to require referral to Pupil Personnel Services.* It is particularly interesting that *the aggressive first grader is far more likely to be nominated by the teacher for PPS than is the withdrawn student. Aggressive students are in more economic need than those students not considered aggressive; they are more likely to need Title I services; are lower in reading and math; and are more likely to repeat a grade.*
Repeaters (N = 333) vs Non Repeaters (N = 1981)	Repeaters are most conspicuous by their *low reading and math scores.* They are *less likely than non repeaters to have a family supportive of school efforts.* The repeater is likely *a Title I student whose teacher believes he needs special services through the Title I program. He is more likely either aggressive or withdrawn than is the non repeater, and he is less likely to participate in classroom activities.* The repeater is more likely to have *health problems and to require referral to PPS.*
Nominated as Serious Behavioral Problem Requiring Referral to PPS (N = 206) vs Those not Nominated (N = 2108)	The single variable best able to discriminate between those requiring referral to PPS and those not requiring referral is knowledge about whether the child is aggressive or not. Knowledge of aggressive behavior accounts for seven times the amount of variance as knowledge of withdrawn behavior. Referrals are *more likely to have economic problems; are lower in math and reading; have more health problems; receive less family support; and participate less in classroom activities.*
Students in Families That are Above Average in Their Support of School Efforts (N = 1398) vs Students in Families with Below Average Support (N = 916)	The relationships between family support and student achievement and behavior are substantial indeed. Students from **highly supportive** families *are much more likely to participate in classroom activities; have higher reading and math scores.* Children from **low support** families *are more likely withdrawn or aggressive and are more likely to repeat a grade. They are less likely to have attended preschool and demonstrate more economic need. They are also more likely to require referral to PPS and evidence more health problems.* The effects of low family support are truly pervasive.

that teachers chose not to refer withdrawn students because they had a particular capability for dealing with these children, but rather, that the aggressive student's behavior was much more noticable; meanwhile, the withdrawn student's problems were, unfortunately, only his own.

Table 1 cont. — Statistical Summary

Classification	Portion of Explained Variance using all Student Information Form Characteristics	Correct Classifications with A Priori Probabilities set at 50-50
Preschool Experience vs No Preschool Experience	5%	60%
Students Nominated by their Teachers as Withdrawn vs Those not so Nominated	37%	88%
Students Nominated by their Teachers as Aggressive vs Those not so Nominated	38%	86%
Repeaters vs Non Repeaters	10%	68%
Nominated as Serious Behavioral Problem Requiring Referral to PPS vs Those not so Nominated	27%	86%
Students in Families that are Above Average in their Support of School Efforts vs Students in Families with Below Average Support	45%	82%

Research with the Self Observation Scales dramatically illustrates the feelings of fundamental inadequacy which many withdrawn and aggressive children share. The increased program emphasis on affective development may serve to sensitize the classroom teacher to the reality that withdrawn children are at least as much in need of special assistance as are aggressive children. Likewise, the teacher is apparently as much in need of inservice on recognition and treatment of withdrawn children's behavior as aggressive children's behavior. Judging from the constellation summaries, both classes of children are equally "at risk."

The second consideration is that extent of family support registers a pervasive impact on a broad range of student outcomes, including achievement and classroom behavior. This finding points up the wisdom in emphasizing parent involvement and the need to continue these efforts. It seems likely that family support is the most potent out-of-school contributor to students' school performance; and to the extent to which the Title I program can effect a positive increase in this variable, the child should benefit.

CHAPTER VI. STUDENT ACHIEVEMENT IN READING AND MATHEMATICS

This chapter presents the evaluation results related to reading and mathematics achievement. The chapter is divided into the following sections: (1) Achievement of Title I versus Non-Title I Students, (2) Achievement Subtest Profile Analyses, (3) Competitive Partnership Achievement Results, (4) Characteristics of Title I High Achievers and Low Achievers and (5) Frequency Distributions for Reading and Math Grade Equivalent Gain Scores.

ACHIEVEMENT OF TITLE I VERSUS NON-TITLE I CHILDREN

This section examines the scores on Total Reading and Total Math of Title I and non-Title I students. Both grade equivalents and percentiles derived from large city norms are reported. At the first grade level, equivalent pre- and posttest measures were not given, and consequently, only the posttest results for this grade are presented. For grades 2, 3, and 7, pre-, post-, and gain scores are reported at each grade level separately for males and females.

Non-Title I first grade students, as expected, average 9 months in reading and 6 months in mathematics ahead of Title I students. Thus, by the end of first grade a substantial achievement disadvantage for Title I students is already evident. Females achieve slightly higher than males in reading and mathematics, and this holds for both Title I and non-Title I groups.

Table 2. Achievement Test Results for First Grade

	Total Reading			Total Math		
	N	Post G.E.	Post percentile	N	Post G.E.	Post percentile
Males						
Title I	1007	1.5	47	1063	1.7	49
Non-Title I	447	2.4	74	469	2.3	71
Females						
Title I	848	1.7	54	877	1.8	53
Non-Title I	536	2.6	79	540	2.4	74

Note: All values are large city norms.

Although Title I first grade students have lower achievement scores than non-Title I first grade students, the average percentile for Title I students is very near the large city norm, with males being slightly below and females being slightly above the 50th percentile. The scores of non-Title I first graders are high indeed, with reading and math averages around the 75th percentile, or five to seven months above grade level.

Pretest scores for second graders show a slight decline over the posttest scores of first graders, possibly reflecting a slight summer regression effect. Grade equivalent gain scores for reading and math at the second grade level are consistently above the norm gain of eight months. In other words, Title I second graders are reducing the achievement disadvantage with which they entered second grade. The typical Title I child enters his second grade experience with a six-month disadvantage, and by the end of second grade the initial disadvantage has been cut in half. Title I second graders leave second grade one to two months off norm. Again, we note a substantial improvement in the second grade Title I student's position relative to the norm. The posttest average percentile for the Title I second grader is very near the norm of 50 in both reading and math, with the Title I male's reading score (42 percentile) being farthest from norm. The non-Title I second grader, like his first grade counterpart, is well above norm with math scores being slightly, but significantly, higher (in terms of percentiles) than the reading scores.

Table 3. Achievement Test Results for Second Grade

	Total reading				Total math			
	N	Pre	Post	Gain (mos.)	N	Pre	Post	Gain (mos.)
Grade equivalent								
Males								
Title I	823	1.5	2.5	10	827	1.6	2.6	10
Non-Title I	278	2.3	3.4	11	278	2.3	3.3	10
Females								
Title I	848	1.6	2.7	11	789	1.6	2.6	10
Non-Title I	373	2.4	3.6	12	367	2.3	3.3	10
Percentile								
Males								
Title I	823	33	42		827	34	46	
Non-Title I	278	60	64		278	61	70	
Females								
Title I	848	38	47		789	36	48	
Non-Title I	373	61	67		367	59	70	

Note. All values are large city norms.

Grade equivalent gain scores in reading for third grade Title I students show a slight decline over the scores just reported for second grade. Title I males, in particular, show less gain than Title I second grade males. Although the reading gain scores are below the second grade gain scores, these students still evidence a month's growth for each month's instruction. Math gain scores for Title I third graders are well above the average gain of one month for each month's instruction, with Title I males and females averaging, respectively, the 41st and 47th percentiles. Again, females tend to outperform males, although the margin is small.

The results and analysis of achievement tests administered to non-Title I seventh graders are not included in this report. Table 5 indicates that Title I seventh graders begin seventh grade more than two years below norm, and by the end of seventh grade the disadvantage has increased in reading and remained stable in math. Again, females slightly outperform the males. The average Title I seventh grader is at the 20th percentile.

Figure 1 presents the percentile scores for Total Reading and Total Math across the grades included in this evaluation. Because the Title I eligibility roster is reestablished each year (to insure that those students most in need receive Title I services), it is possible that the deterioration in percentile rank across the grades simply reflects the constant reshuffling of the Title I roster. However, it is also possible that the deterioration in reading scores across the first three grades is the product of the "cumulative difference" phenomenon often observed in Title I program evaluations. A determination as to whether the deterioration process is due to constant restructuring of the group served or represents a real cumulative difference pattern requires a longitudinal design. The authors strongly recommend that a longitudinal multiyear follow-up study be undertaken. Later in this section a general theory is offered which accounts for the deterioration process apparent in the reading scores.

Table 4. Achievement Test Results for Third Grade

		Total Reading				Total Math		
	N	Pre	Post	Gain (mos.)	N	Pre	Post	Gain (mos.)
Grade Equivalent								
Males								
Title I	1125	2.2	2.9	7	1074	2.5	3.4	9
Non-Title I	245	3.2	4.4	12	234	3.2	4.3	11
Females								
Title I	946	2.5	3.3	8	885	2.5	3.6	11
Non-Title I	316	3.4	4.5	11	317	3.2	4.5	13
Percentile								
Males								
Title I	1125	30	33		1074	32	41	
Non-Title I	245	53	61		234	57	65	
Females								
Title I	946	35	41		885	34	47	
Non-Title I	316	56	65		317	57	69	

Note. All values are large city norms.

Table 5. Achievement Test Results for Seventh Grade

		Total Reading				Total Math		
	N	Pre	Post	Gain (mos.)	N	Pre	Post	Gain (mos.)
Grade equivalent								
Title I males	395	4.6	5.2	6	317	4.6	5.4	8
Title I females	371	4.9	5.4	5	314	4.8	5.6	8
Percentiles								
Title I males	395	18	19		317	16	19	
Title I females	371	20	20		314	16	21	

Note. All Values are large city norms.

Interestingly, the deterioration in percentiles across grades, so obvious for Total Reading, is not nearly as pronounced for the Total Math scores. Why Total Math scores should remain so stable and so near the large city norm (across the primary grades) is not immediately apparent, although some type of differential program impact cannot be ruled out.

As would be expected, the seventh grade scores are consistently near the twentieth percentile mark. These scores highlight two important points: (1) seventh grade students in need of services are being identified accurately and served, and (2) the potential for successful remediation of students who have experienced seven to eight years of academic failure (or, at best, severely limited success) is slight indeed. All in all, the greatest achievement growth for the dollar is being realized in the primary grades.

Females at every grade level outperform the males, and this holds true for both Total Reading and Total Math. The deterioration process, mentioned above, is present in both the male and female Total Reading score profiles across grades. On the other hand, Total Math scores for females show very limited decrease over the primary grades, while males show a definite decrease. Again, why males and not females should show this decrease is not immediately obvious.

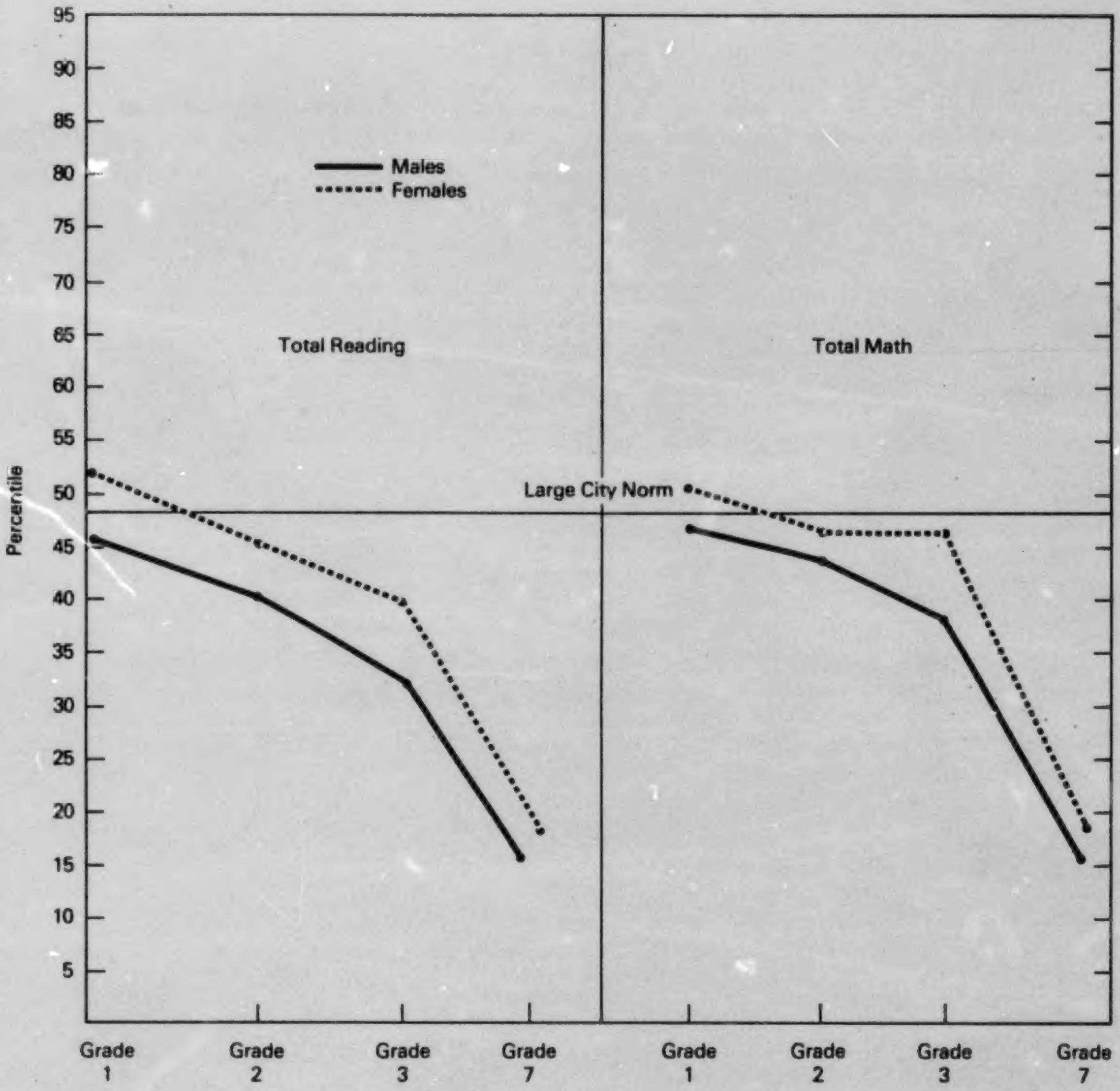


Figure 1. Title I Students Posttest Percentile Scores by Grade for Total Reading and Total Math (large city norms)

It seems apparent from the above tables that the Title I program is registering a clear and substantial impact in reading and math at the primary grades. Two observations are indicated. First, a carefully designed evaluation of the summer school program is clearly needed. If some of the summer regression effect can be eliminated, the program outcomes would be even more impressive. Second, all results point to the potential of early intervention. From a programmatic perspective, a gradual shift in orientation away from remediation and toward prevention may be indicated.

ACHIEVEMENT SUBTEST PROFILE ANALYSES

This section examines the relative strengths and weaknesses of Title I students at each grade level in terms of reading and math subtest performance. Such an analysis can offer information about potential differential program impact which may or may not be intentional. Figure 2 presents the first grade achievement profile for four subtests of the California Achievement Test.

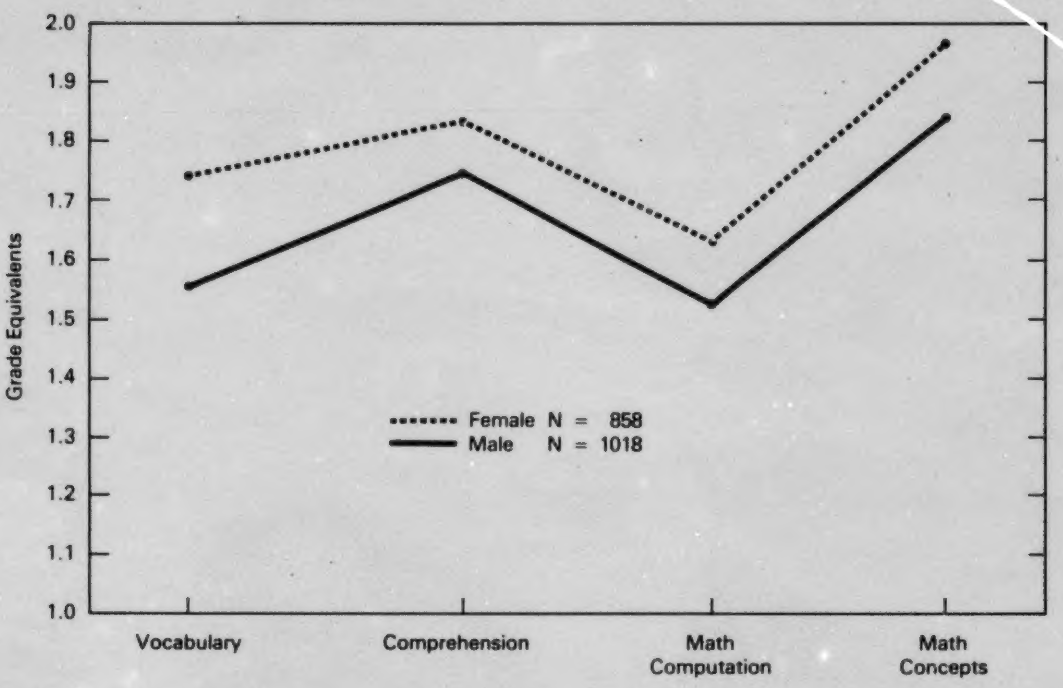


Figure 2. First Grade Achievement Subtest Profile CAT Posttest Grade Equivalents

The first grade profile is moderately stable with highs on Reading Comprehension and Math Concepts, and lows on Vocabulary and Math Computation. This profile differs considerably from the other grades in several important respects. Males and females are identical in profile shape, while females have a higher profile level than males. In most cases at the other grade levels Vocabulary is higher than Comprehension. One might argue that vocabulary is a necessary but not sufficient precondition for advancement in reading comprehension. As such, we would expect Vocabulary scores to be generally higher than Comprehension.* Yet another explanation for the differences between reading profiles of first graders and other grades is that the first grade Comprehension subtest may be more dependent on vocabulary than other test levels, that is, reasoning is less implicated in first grade Reading Comprehension than in third grade Reading Comprehension.

The second grade subtest profile presented in Figure 3 is quite different from the first grade profile. At the second grade level, Comprehension and Computation are low, and Vocabulary and Concepts are high. Sex differences are greater on the Reading subtests and much smaller on the Math subtests. A comparison of the second grade and first grade profiles highlights some rather dramatic shifts in relative strength and weakness in the Reading area. In particular, Reading Comprehension scores are lower than Vocabulary scores, and this trend will continue at the third and seventh grades.

---

*That standardized scores are employed tends to mask this effect.

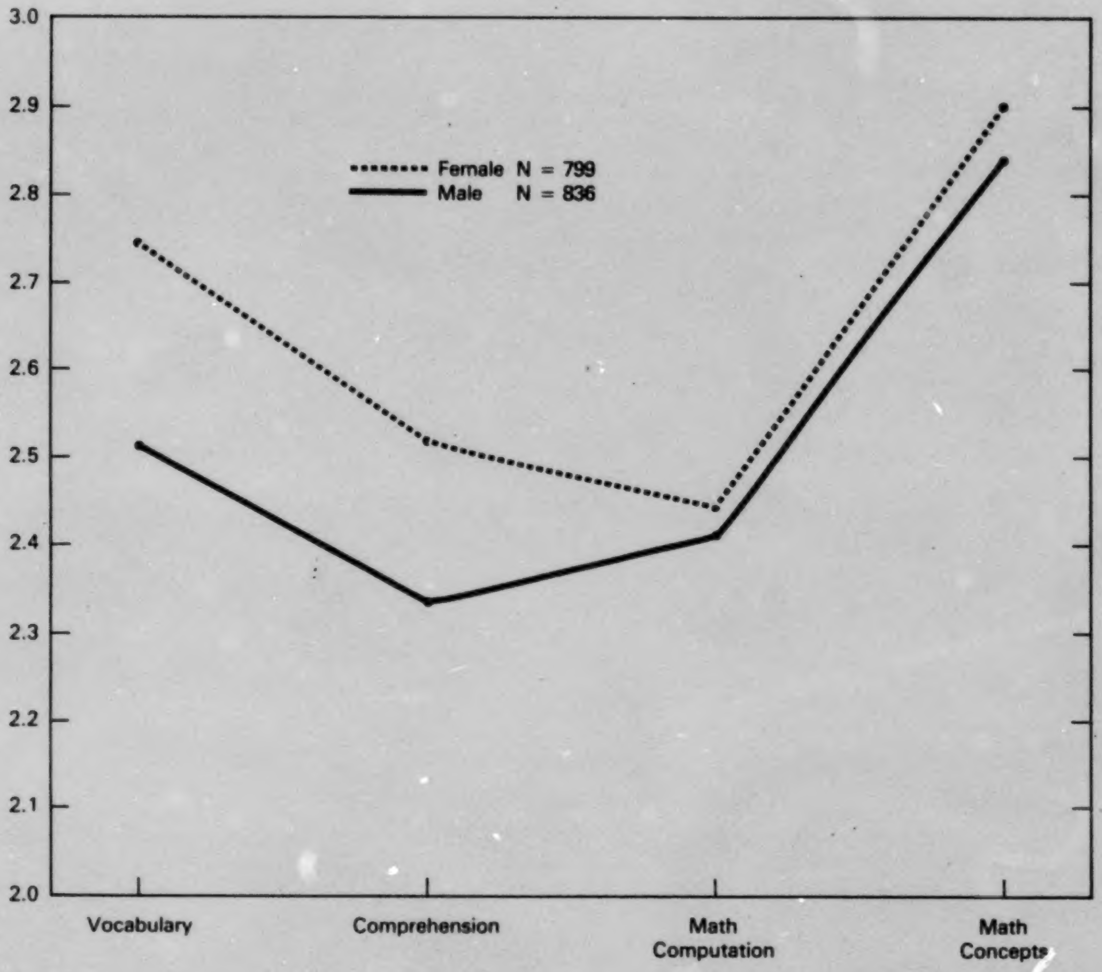


Figure 3. Second Grade Achievement Subtest Profile CAT Posttest Grade Equivalents

The third grade profiles are given in Figure 4 and, again, we observe some substantial shifts.

The first sex differences in profile shape appear at the third grade level. Females have higher Comprehension scores than Vocabulary scores, while the opposite holds for males. Other than this difference, the profile shapes are quite similar. At the second grade level Math Computation tended to be lower than Math Concepts, while at the third grade level a substantial inversion of this relationship is apparent. It is also true that larger differences between males and females are evident at the third grade.

The seventh grade profile is given in Figure 5 and reproduces essentially the same profile shape that appeared in third grade.

One explanation for the somewhat haphazard manner in which the subtest profiles change shape from grade to grade is that although the subtests have the same label across the grades (e.g., Math Concepts), these subtests are not measuring the same construct (attribute or trait) across the grades (jingle fallacy). This would be a particularly disconcerting finding and would obviate any attempts at longitudinal analyses. If the structure (i.e., essence of what is being measures) shifts from grade to grade, then examining subtest strengths and weaknesses across grades would be hopelessly misleading. A small, carefully controlled articulation study could check the structural integrity of each reading and math subtest, and such a study seems highly indicated.

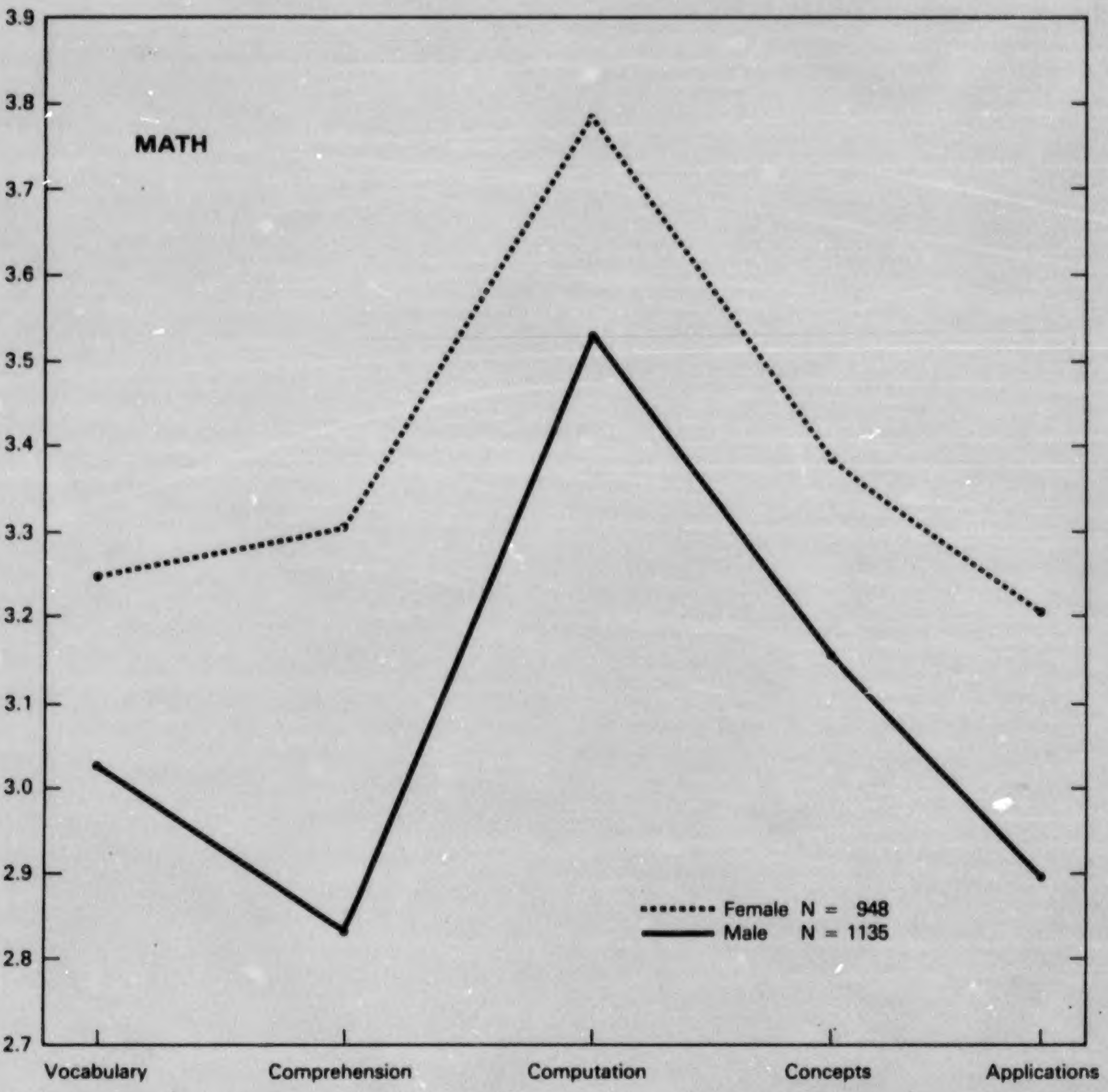


Figure 4. Third Grade Achievement Subtest Profile CTBS Posttest Grade Equivalents

It appears possible that the shifts in profile shape may be due to inadvertent changes in the amount of "relation eduction ability" required of a child at the various grade levels. Thus, for example, Reading Comprehension at the first grade level is higher than Vocabulary because performance on the Vocabulary subtest requires more relation eduction (drawing out important relationships) than does Comprehension. As grade level increases, the Comprehension subtest requires more relation eduction and the Vocabulary subtest comparatively less. Thus, by the seventh grade there is almost eight months difference between Vocabulary and the highly relation eduction saturated subtest — Reading Comprehension.

The above hypothesis may also offer an explanation for the cumulative difference phenomenon observed with Title I students, that is, the longer they are in school, the farther behind they become. The early grades, particularly kindergarten and first grade, present material which can be grasped equally well through an associative learning mode or a relation eduction mode. In the associative mode the child acquires (learns, or more accurately, memorizes) a series of stimulus response chains such as

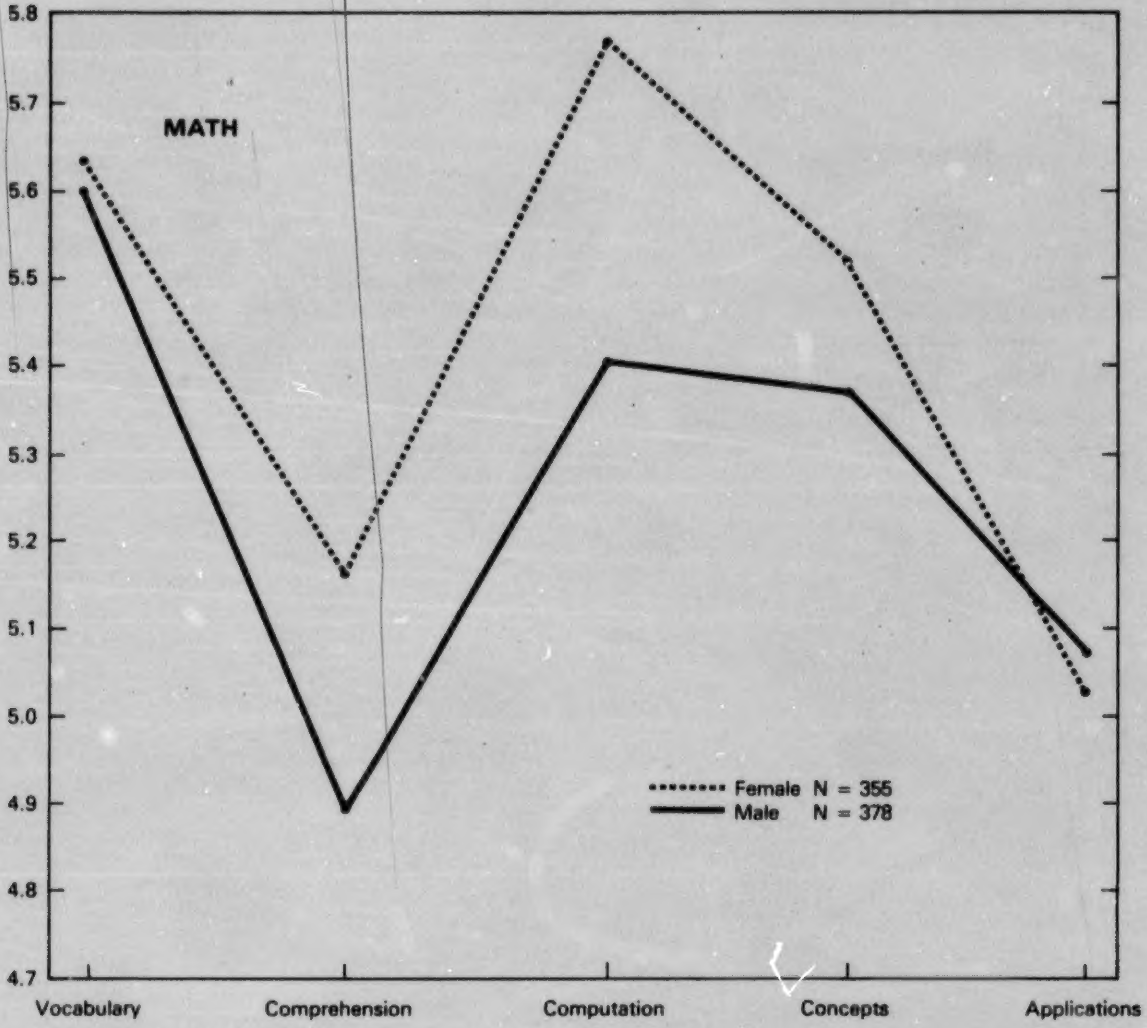


Figure 5. Seventh Grade Achievement Subtest Profile CTBS Posttest Grade Equivalents

2 + 2 = 4. In the relation eduction mode the child grasps the essential relationships holding in the statement 2 + 2 = 4. A cursory examination of these two children will fail to uncover any differences between their knowledge, although differences exist and are fundamental. Associative learning does not easily transfer, is forgotten more readily (perhaps explaining the summer regression effect) and, from an affective perspective, is boring. A simple example may serve to clarify this point. Children at the age of seven acquire spontaneously (through relation eduction) the ability to conserve liquid quantity. Briefly, children who conserve realize that substances maintain their quantity under certain transformations. If a nonconserver is asked if two equal balls of clay have the same amount of clay, he will respond that they do, but will change his answer if one of the balls is flattened into a pancake. Children can be taught associatively to respond correctly to conservation-type questions, but this type of knowledge is of meager value to the child. What turns out to be most important is not so much what a first grader knows, but how he learned it (i.e., associatively or eductively). The prognosis for a child who has learned his "readiness" skills associatively is poor because his relation eduction ability is insufficient to tackle the learning required in first grade. The child responds by attacking each new learning situation associatively. As the child moves through first, second and third grade, less and less of what he is called upon to learn can be grasped associatively, and frustration and failure increase.

Such a theory also explains why readiness tests are such notoriously poor predictors of end-of-first-grade success. Readiness tests yield information on what the child knows, not how he learned it; and what he knows (colors, alphabet, numbers, shapes) is not the important ingredient in predicting future achievement. The important piece of knowledge about the child is whether the child's relation eduction ability has developed to the point that he can spontaneously educe the relationships within the material he is given to master.

Thus, we see the dilemma facing the Title I child. He wants the approval and recognition which accompany successful performance (which usually means the correct answer); however, he is incapable of grasping the relationships necessary to an understanding of the material, so he does what all of us do when faced with a similar dilemma, he begins the slow associative process of acquiring what appears to the child to be unrelated bits of knowledge in the form of stimulus response chains, varying in complexity. The double bind is now set because the child gradually develops an associative style or habit which is not only of limited effectiveness when the child lacks the relation eduction ability to grasp a particular relationship, but becomes a dominant response tendency even in those problem situations in which the child's relation eduction ability is clearly adequate for the task.

Deficits in Title I children's achievement may reflect their unsuccessful attempts to respond associatively to material which is so rich and complex that the associative process is increasingly unequal to the task. If this explanation is substantiated it has specific implications for the scope and sequence of elementary school curriculum.

A partial solution to this problem appears quite straightforward. The relation eduction ability of each child should be carefully monitored and the child should be presented material which can be handled eductively within his capacities. As the relation eduction ability grows, and it might grow faster if utilized intensively, the material presented to the child can increase in complexity, keeping step with the increasing relation eduction abilities. The instructional implications which derive from this simple motion are substantial. For example, it might prove advisable to postpone presentation of mathematical concepts such as "regrouping" until a child has firmly acquired conservation abilities. Likewise, it may prove desirable to delay formal reading instruction until the child attains some level of relation eduction ability, not so much because a particular relation eduction ability level is a precondition to reading, but rather, because it is important that the child addresses the challenge of learning to read from an eductive rather than an associative orientation.

COMPETITIVE PARTNERSHIP ACHIEVEMENT RESULTS

This 1974-75 evaluation marks the third and last year of the Competitive Partnership (CP) program. The CP program is a joint school/industry effort to investigate the comparative effectiveness of several reading and mathematics programs. In particular, three reading approaches (D.C. Heath, McGraw-Hill, and Random House) and three math approaches (D.C. Heath, Random House, and Addison Wesley) are compared in this evaluation.

The past two years of reading results have failed to support one program as superior to the others in Total Reading achievement. For example, the 1972-73 evaluation found the D.C. Heath program with the highest reading achievement scores, while the 1973-74 evaluation showed mixed results across grades. The 1973-74 report states:

> The standardized test results for the two-year period do *not*, at this point, show a clear pattern favoring one reading program over the other. In 1973-74, the McGraw-Hill reading programs achieved better results than the other two (programs) in grade 2 (1.1 vs 0.9). Reading total gain score, grade equivalents; Random House reading programs achieved better results in grade 1 than the other two reading programs . . . but there was no difference among the programs in reading tests in grade 3.

The math achievement results have been more consistent than the reading results, with D.C. Heath showing higher adjusted posttest scores at the second and third grade levels. The 1973-74 report states:

> The test results for grades 2 and 3, for both 1972-73 and 1973-74, show that D.C. Heath was the most effective in terms of student total (math) gain score grade equivalents.

It was also noted in the 1973-74 report that the D.C. Heath math program was less expensive than the two alternatives. We turn now to an analysis of the 1974-75 reading and math scores. Only matched pre-post records were used in this analysis. Because first graders were administered different tests, pre- and post-, and because all seventh graders are enrolled in the D.C. Heath program, the following analysis focuses on second and third graders only.

Table 6 summarizes the differences in adjusted posttest scores for second grade across the various reading and math programs. Analysis of covariance has been used to adjust posttest scores for pretest differences. The Duncan Multiple Range Test was employed for all contrasts, with adjusted posttest scores as the criterion variable.

Table 6. Second Grade Reading and Math Adjusted Grade Equivalent Posttest Means and Standard Deviations across Reading and Math Programs with Significant Tests for each Contrast

Program	N *N*	Total Reading $\overline{X}$	S.D.	D.C. Heath	Contrast Summary McGraw-Hill	Random House	Combination
D.C. Heath	251	2.55	.66	–	–	–	–
McGraw-Hill	588	2.64	.75		–	←	←
Random House	330	2.44	.58			–	–
Combination	55	2.36	.59				–

Program	N *N*	Total Math $\overline{X}$	S.D.	D.C. Heath	Contrast Summary Random House	Addison Wesley	Combination
D.C. Heath	526	2.63	.61	–	←	–	–
Random House	263	2.52	.53		–	↑	–
Addison Wesley	408	2.66	.63			–	–
Combination	50	2.54	.51				–

← or ↑ Indicates significant difference ($p < .05$) in favor of group indicated
(for example, McGraw-Hill attained higher Total Reading gains than either Random House or Combination).

Only four of twelve contrasts across reading and math are significant at or beyond the .05 level. As Table 6 indicates, the McGraw-Hill reading program is superior to the Random House and combination approaches. Differences between D.C. Heath and the other three approaches are not significant. This finding is consistent with the 1973-74 finding that the McGraw-Hill program was more effective than the other two programs at the second grade level. Thus, for two years in succession, the McGraw-Hill approach at the second grade has yielded better standardized reading achievement scores than the other two competitors.

The math achievement findings, again for the third straight year, show D.C. Heath to have higher adjusted math scores than the Random House and combination approaches. However, Addison Wesley is, likewise, higher than the Random House and combination approaches although no differences are apparent between D.C. Heath and Addison Wesley. Before summarizing the program effects, a presentation of the third grade results is in order.

Table 7. **Third Grade Reading and Math Adjusted Grade Equivalent Posttest Means and Standard Deviations across Reading and Math Programs with Significant Tests for each Contrast**

Program	$\frac{N}{N}$	Total Reading $\overline{X}$	S.D.	Contrast Summary D.C. Heath	McGraw-Hill	Random House	Combination
D.C. Heath	453	2.90	.90	—	↑	↑	—
McGraw-Hill	686	3.12	1.00		—	—	←
Random House	352	3.18	1.04			—	←
Combination	81	2.86	1.20				—

Program	$\frac{N}{N}$	Total Math $\overline{X}$	S.D.	Contrast Summary D.C. Heath	Random House	Addison Wesley	Combination
D.C. Heath	507	3.40	.69	—	↑	—	—
Random House	406	3.65	.82		—	—	—
Addison Wesley	501	3.46	.72			—	—
Combination	59	3.45	.83				—

← or ↑ Indicates significant difference ($p < .05$) in favor of group indicated

CHARACTERISTICS OF TITLE I HIGH ACHIEVERS AND LOW ACHIEVERS

It is a fact that some children benefit more from the Washington, D.C., Title I program than do other children. The concern of this section is to identify the characteristics which differentiate those children who have gained most in achievement from those students who have gained least. Such an analysis begins to indicate what types of students benefit most from the Title I program, and what types the least. No program is universally effective, and for this reason it is important that program planners know with which children the program is succeeding and with which children more needs to be done.

After adjusting posttest reading and math scores for pretest differences, students were rank ordered from high to low on the adjusted achievement scores. The top 25 percent and the bottom 25 percent were then selected for analysis. Two-group discriminant analysis was used to define those Student Information Form characteristics which best differentiated high achievers from low achievers. Only second and third graders were included in this analysis. Table 8 summarizes the findings. The column headed "relationship of characteristic to achievement" includes pluses (+) and minuses (—) which indicate whether the relationship between a particular characteristic and achievement is positive or negative. For example, the characteristic "family supportive of classroom activities" is positively related to all achievement areas, (i.e., the more supportive the family, the higher the child's achievement is likely to be), whereas the characteristic "economic need" is negatively associated with achievement, *i.e.*, the higher a child's economic need, the lower his achievement is likely to be. The column headed "percent of explained variance" provides an estimate of the importance of the characteristic in predicting achievement. The higher the percent, the more important the characteristic. The F value is a statistic for evaluating the likelihood that the relationship between the characteristic and achievement is due to chance. All of the nonzero F values are highly significant, meaning it is unlikely that the relationships expressed in "percent of variance explained" are due to chance. The summary table gives the sample sizes and the percent of variance explained when all the characteristics are used at one time. The "percent of correct classifications" gives the number of times in each one hundred that we could correctly predict that a child is a high gainer or low gainer on the basis of Student Information Form variables. As the table indicates, a knowledge of the SIF characteristics allows us to predict with considerable accuracy whether a child will gain a lot or gain a little on reading and math achievement tests.

Table 8. Summary of Characteristics Differentiating Students with High Adjusted Gain Scores from Students with Low Adjusted Gain Scores

		Second grade				Third grade			
	Relationship of characteristic to achievement	Total Reading		Total Math		Total Reading		Total Math	
Characteristic		% of explained variance	F* value	% of explained variance	F value	% of explained variance	F value	% of explained variance	F value
1. Preschool experience		0	0	0	0	0	0	0	0
2. Withdrawn behavior	–	15	72	13	58	13	73	14	73
3. Aggressive behavior	–	5	23	4	15	4	23	1	4
4. Voluntarily participates in class activities	+	57	537	47	335	49	472	38	271
5. Family supportive of classroom activities	+	41	278	24	118	28	197	18	97
6. Economic need	–	8	33	2	9	6	32	1	7
7. Requires referral to PPS	–	9	39	7	29	7	39	6	28
8. Physical or health problems	–	3	13	2	8	2	9	4	18
9. Communications problems	–	5	21	2	9	3	18	3	14
10. Days absent from school	–	8	34	4	15	3	18	1	7
Summary Table									
Sample size (Low achievers over High achievers)		187/221		204/183		231/270		207/229	
Canonical correlation		.78		.69		.71		.65	
% of explained variance		60		48		51		42	
% of correct classifications		88		84		85		81	

*All nonzero values are significant beyond the .01 level.

Upon examination of Table 8, one is immediately impressed by the magnitude of some of the relationships. Surprisingly, preschool experience is unrelated to adjusted gain scores in second and third grade achievement. Withdrawn and aggressive behavior are both significantly related to achievement gain, but withdrawn behavior is about three times as powerful in discriminating high and low gainers. As might be expected, voluntary participation in classroom activities is highly related to achievement in both reading and math, although the relationship is significantly greater for reading. Regardless of whether achievement is the cause of increased participation or increased participation causes achievement, the relationship is substantial and suggests that additional study is indicated, perhaps directed at the causality question.

Family support of classroom activities is highly related to achievement in reading and math, but reading scores are considerably more affected by this characteristic than are math scores. Likewise, "economic need" is related to reading achievement, but only slightly affects math achievement. Children requiring referral to Pupil Personnel Services (PPS) gain less in both reading and math than students not requiring PPS services. Physical or health problems and communications problems tend to characterize the low achieving group to a greater degree than the high achieving group. Absences affect both reading and math in the second grade, but have a decidedly reduced impact at the third grade level. Absences tend to affect reading achievement at the second grade level to a greater extent than math achievement.

Combining the ten characteristics into a constellation, we can grasp the overall significance of the relationship between achievement and these characteristics. Knowledge of a group of students' ten characteristics permits assignment of these students to the high or low achievement groups with 80-85 percent accuracy, that is, out of 100, 85 students would be correctly classified and only 15 would be misclassified. If all ten characteristics operated as causal influences on achievement, between 50 and 60% of the achievement variance could be manipulated by altering a child's status on selected characteristics (e.g., reduce health problems or increase parent support). Unfortunately, we do not know which of the ten characteristics operate as determiners (causes) of achievement and which are the result of achievement. For example, does withdrawn behavior cause poor achievement or does poor achievement cause withdrawn behavior? In all probability, a reciprocal causal influence is operating, but the preponderance of causal influence is in one direction or the other. Methodologies have been recently developed to tease out casual influences in behavioral data. Those methodologies require a longitudinal design, but the payoff could be particularly valuable to program planners.

In summary, there are substantial differences between students who are successful in the Title I program (i.e., achieve in reading and math) and those who do not experience commensurate levels of success. These differences are presented in the form of student characteristics, some of which are within the purview of the Title I program and some of which are outside the influences of the schools. Clearly, most behavior-related characteristics can be affected by the school program, but the real and substantial impact of the home on these variables must be recognized. The extent of family support of classroom activities, and economic need are, for the most part, outside the confines of Title I program responsibility, although the parent involvement component may offer some hope in this area. One need only look at the substantial relationship between family support (characteristic 5) and student achievement to grasp the impact that the home has on a child's cognitive and affective development.

FREQUENCY DISTRIBUTIONS FOR READING AND MATH G.E. GAIN SCORES

Summary statistics such as the mean, median, and standard deviation, while useful in providing important indications of average group performance, are inadequate for some purposes. For example, it is often important to know what percent of the students fall at or below a criterion level. Tables 9 and 10 give the frequency distributions for grade equivalent gains (in months) for Title I and non-Title I students by grade level in Total Reading and Total Math. This presentation makes much more explicit certain interesting characteristics of the achievement of both groups.

The gain score frequency distribution for Total Reading presented in Table 9 illustrates quite dramatically the "cumulative difference" pattern in Title I students' achievement. At the second grade level fully 50% of the Title I students show better than one month's growth for one month's instruction (i.e., between 9 and 10 months' growth in Total Reading). At the third grade level the point at which 50% achieve more and 50% achieve less (median) is 7 months, and at the seventh grade level the median is 5 months. As might be expected, the non-Title I median is higher with the second and third grade medians being 11 months and 10 months respectively.

The gain score frequency distribution for Total Math is presented in Table 10. The median gain score for Title I second graders is 9 months, for third graders 9 months, and for seventh graders 7 months. Thus the cumulative deficit observed in the reading gains is not so apparent in mathematics and, in fact, has been essentially arrested at the second and third grade levels. The non-Title I second graders show a median gain of 9 months and, surprisingly, there is little difference between the Title I and non-Title I second grade distributions; however, third grade gains for non-Title I students are markedly higher with the median gain being 11 months.

Some additional highlights of the frequency distributions are as follows:

- Forty percent of Title I second graders gained between 9 months and 17 months in Total Reading.
- Twenty-five percent of the second and third graders gained less than six months in Total Reading.
- Twenty-two percent and thirty-six percent of third and seventh graders, respectively, registered either no gain or a loss in Total Reading.

Table 9. Frequency Distribution for Grade Equivalent Gain Scores in Months for Reading Achievement

	Title I						Non-Title I			
	Grade 2		Grade 3		Grade 7		Grade 2		Grade 3	
Months gain	*N*	Cumulative %	*N*	Cumulative %	*N*	Cumulative %	*N*	Cumulative %	*N*	Cumulative %
0 or below	110	7.1	440	21.7	255	36.1	24	3.7	53	9.5
1	25	8.7	68	25.0	13	37.9	10	5.3	14	12.0
2	39	11.2	75	28.7	27	41.7	14	7.5	15	14.6
3	57	14.9	82	32.7	23	45.0	20	10.6	20	18.2
4	71	19.4	88	37.1	19	47.7	17	13.2	25	22.7
5	73	24.1	70	40.5	23	50.9	22	16.6	22	26.6
6	79	29.2	120	46.4	22	54.0	34	21.9	26	31.3
7	110	36.3	91	50.9	22	57.1	38	27.8	31	36.8
8	86	41.8	102	55.9	17	59.5	36	33.4	28	41.8
9	92	47.7	79	59.8	21	62.5	35	38.8	28	46.8
10	93	53.7*	73	63.4	17	64.9	43	45.5	25	51.2
11	89	59.5	102	68.4	11	66.5	39	51.8	29	56.4
12	97	65.7	57	71.2	24	69.9	52	59.6	26	61.1
13	84	71.1	82	75.3	17	72.3	35	65.1	23	65.2
14	79	76.2	65	78.5	15	74.4	41	71.4	19	68.6
15	54	79.7	52	81.0	20	77.2	21	74.7	24	72.9
16	68	84.0	43	83.2	12	78.9	29	79.2	21	76.6
17	44	86.9	47	85.5	15	81.0	17	81.8	22	80.5
18	31	88.9	37	87.3	13	82.9	21	85.1	17	83.6
19	33	91.0	27	88.6	14	84.9	11	86.8	12	85.7
20	31	93.0	29	90.1	8	86.0	11	88.5	7	87.0
21	21	94.3	29	91.5	11	87.6	8	89.8	3	87.5
22	19	95.6	34	93.2	12	89.3	16	92.2	7	88.7
23	11	96.3	11	93.7	9	90.5	4	92.9	12	90.9
24 +	58	100.0	128	100.0	67	100.00	46	100.0	51	100.0
Totals	1554		2031		707		644		560	

*Boxed cumulative percentage indicates median value, i.e., point at which half the students scored above and half below.

The last highlight deserves some further discussion. Apparently, a number of Title I students are being tested at a level which is beyond their achievement level. Some of these children get lucky and score above chance on the pretest, but because luck is random, they score below or at chance on the posttest and, consequently, show a loss in achievement. It is highly unlikely that the students showing a loss are actually, in fact, "losing" in either absolute achievement or relative standing (to the degree indicated by the change scores). Rather, it is most probable that these students are being tested considerably beyond their functioning reading level and, consequently, chance or luck determines their scores. One solution to this difficulty is to test students with the level appropriate for their performance level, not their grade or age level. Such a strategy, termed "out-of-level testing," should increase the reliability and validity of the achievement scores.

Table 10. Frequency Distribution for Grade Equivalent Gain Scores in Months for Math Achievement

	Title I						Non-Title I			
	Grade 2		Grade 3		Grade 7		Grade 2		Grade 3	
Months gain	*N*	Cumulative %	*N*	Cumulative %	*N*	Cumulative %	*N*	Cumulative %	*N*	Cumulative %
0 or below	92	5.9	76	8.4	133	26.2	32	5.0	22	4.1
1	36	8.2	46	10.9	18	29.7	8	6.3	9	5.8
2	52	11.5	60	14.2	17	33.0	20	9.5	18	9.2
3	58	15.2	74	18.2	17	36.2	18	12.3	14	11.8
4	78	20.1	76	22.3	19	39.8	33	17.5	7	13.2
5	82	25.4	77	26.5	26	44.8	18	20.3	26	18.0
6	102	31.8	95	31.6	19	48.5	48	27.9	18	21.4
7	92	37.7	104	37.2	18	51.9	49	35.6	26	26.3
8	106	44.5	98	42.6	21	55.9	46	42.9	31	32.1
9	108	51.3*	87	47.3	18	59.4	43	49.7	19	35.7
10	107	58.2	111	53.3	15	62.3	52	57.9	38	42.9
11	114	65.4	109	59.2	19	65.9	49	65.6	34	49.2
12	92	71.3	106	64.9	14	68.6	31	70.5	27	54.3
13	75	76.1	112	71.0	17	71.8	34	75.9	29	59.8
14	86	81.5	88	75.7	13	74.3	32	80.9	37	66.7
15	60	85.4	59	78.9	13	76.8	38	86.9	29	72.2
16	45	88.2	62	82.3	11	78.9	24	90.7	20	75.9
17	36	90.5	48	84.9	16	82.0	13	92.7	25	80.6
18	38	92.9	49	87.5	9	83.7	15	95.1	9	82.3
19	32	95.0	46	90.0	9	85.4	8	96.4	12	84.6
20	22	96.4	36	92.0	5	86.4	12	98.3	15	87.4
21	21	97.7	23	93.2	11	88.5	2	98.6	11	89.5
22	10	98.3	23	94.5	6	89.7	3	99.1	12	91.7
23	3	98.5	17	95.4	4	90.4	1	99.2	8	93.2
24 +	23	100.0	85	100.0	50	100.0	5	100.0	36	100.0
Totals	1570		1847		522		634		532	

*Boxed cumulative percentage indicates median value, i.e., point at which half the students scored above and half below.

CHAPTER VII. PIAGETIAN CONSERVATION ASSESSMENT

A child's cognitive development is already far advanced on the day that he begins formal education. Long before a child reaches school age, he acquires a variety of mental skills and perceptual abilities which prepare him for learning in the school environment. In recent decades educators have been particularly interested in understanding cognitive development in children and in modifying their curricula and methods accordingly.

Jean Piaget's theories of mental development are well known among educators. Without getting sidetracked onto a discourse on Piagetian theory, we can summarize his position as follows: there are four cognitive stages (sensorimotor, preoperational, concrete, and formal) through which all children progress. The order of these stages is invariant for all children although individual children may vary in the age at which they master any given stage. At each stage the child encounters a world that needs ordering, and he applies his general relation perceiving ability (which is maturing) to educe relations which, in turn, are used to impose order on a previously unordered segment of his environment. The general relation perceiving ability which is required for normal progress through Piaget's stages we are calling relation eduction ability. It is important to note that Piaget has investigated and developed measures for some of the major milestones in the cognitive development of children. Many other milestones remain unidentified, and there are many hundreds of subtle relations and abstract concepts that children acquire between three and seven or eight years of age that, for the time being, remain unidentified.

Children from the ages of two through seven usually are classified in the Piagetian preoperational stage, during which their thinking focuses on appearances and considers single, concrete aspects of a situation only. Conceptual skills develop only after age five, during the intuitive phase of preoperational development. This phase is identified by the attainment of conservation, the ability to recognize that perceptual changes in objects do not disrupt their basic attributes (Raven and Salzer, 1971). For example, a conserving child will say that the amount of clay in a ball which he has watched being flattened into a disc is unchanged, but a nonconserver will say that the disc has more clay than the ball did. Nonconserving children lack the conceptual background which they need to assimilate their experiences in school and thus may suffer academically. Considerable research has focused on various academically related aspects of Piagetian conservation. This section will review findings on accelerating conservation attainment, on the relationship between conservation and achievement in reading and arithmetic, and on socioeconomic differences in conservation understanding.

Most work in conservation induction (attempting to accelerate the rate of conservation acquisition) has been done with number, since conservation of number usually develops before conservation of length, area, substance, or other qualities. Brainerd and Allen (1971) noted that seven of nine attempts to induce number conservation by training school-age children were successful. Despite considerable heterogeneity in technique, all successful experiments included "object-bound reversibility" in their training. This simply means deforming one of two identical arrays of objects and then reversing the deformation so that the arrays of objects are again indentical. Piaget considers an understanding of reversibility essential to conservation attainment. Meyers, Yoshida, and Genrich (1975) echo the conclusions of Brainerd and Allen in a recent review, that conservation skills can be taught, that they can be transferred to new situations of the same type, although generalizing to different types is weak, and that acquired responses resist contradiction and are of reasonably long duration.

Conservation skills can be taught, but their value to educators rests in their correlation with academic achievement. Kaufman and Kaufman (1972) tested 80 white kindergartners from upper class backgrounds with three predictors of first grade achievement: the Gesell School Readiness Test (a behavioral inventory), the Lorge Thorndike Intelligence Test, and a Piagetion battery including number and length conservation. At the end of first grade, these children took the Stanford Achievement Test. Simple correlations (r) between the three kindergarten test scores and the SAT subscales in arithmetic, spelling, and reading ranged from 0.58 to 0.64. The Piagetian battery is thus comparable to the Gesell or Lorge Thorndike tests in predicting academic achievement in first grade.

Bearison (1975) went further and compared natural and induced conservers as well as controls on the variety of scales from the Otis-Lennon Intelligence Test and the Stanford Achievement Test, which were taken in grade 3. Conservation tests were given in kindergarten. After adjusting for intelligence, natural conservers scored highest in word study skills, word meaning, paragraph meaning, arithmetic computation and concepts; induced conservers did next best and nonconserving controls fared worst. This pattern did not occur for spelling, vocabulary, and grammar subtests, which are symbolic in nature (and are acquired associatively) and do not involve mental manipulations. This work clearly underlines the relationship between conservation and school achievement.

Several studies have been specifically concerned with conservation skills and reading achievement. Brekke, Williams and Harlow (1973) tested 81 first graders at the beginning of the school year with the Gates-MacGinitie Reading Readiness Test, the Primary Mental Abilities Test, and with five conservation tasks. In general, IQ scores correlated more strongly than conservation scores with reading subtest results. For example, auditory discrimination scores correlated with IQ at $r = 0.48$, and with conservation scores at $r = 0.28$. IQ and conservation scores were correlated with an r of 0.38. Following administration of the Bender-Gestalt Test for Children, the Wepman Auditory Discrimination Test, and six conservation tasks, results showed a relationship between attainment of conservation skills and reading comprehension level. Similar results have been reported for children with reading disabilities (Hurta, 1972).

Studies specifically concerned with conservation abilities and math achievement have, for the most part, indicated a relationship similar to that between reading achievement and conservation. Kaminsky (1970) tested 180 second and third grade children from four schools in a middle class community with a 72-item conservation concept test, the Lorge-Thorndike Intelligence Test, and the Arithmetic subtest of the Stanford Achievement Test. Correlations between conservation scores and other subtest scores ranged from 0.23 (IQ) to 0.81 (arithmetic concepts). Although no sex-related differences were reported, second graders achieved a mean score of 44 on the conservation test, and third graders scored an average of 54, suggesting a developmental trend. School-related differences were also found, which were tentatively attributed to socioeconomic influences. Rohr (1973) tested 42 third graders from three Tennessee schools for conservation of number, area, length, and volume, and also administered the computation, concepts, and problem-solving subtests of the Metropolitan Achievement Test. Significant differences between conserver and nonconserver performance on all but one subscale occurred for area conservation and for all subscales on volume conservation. The total number of correctly completed conservation tasks correlated significantly with math achievement. Sohns (1975) and Cathcart (1971) examined other aspects of the relationship between conservation and arithmetic achievement and also found persistent associations.

Conservation attainment is highly related to socioeconomic status. Gaudia (1972) compared 126 low SES children in grades 1 to 3 from rural, small town, and city backgrounds. Approximately equal proportions were black, white, and American Indian, and all were tested with Goldschmidt and Bentler's Conservation Concept Diagnostic Kit, Form A. These children scored about two years below the performance norm for middle class children of the same age. Racial differences in conservation were far outshadowed by differences due to social class. The mean middle class score of 11 was attained by only 32 of the 126 children tested, and no subgroup mean was greater than 8. Other studies (Figurelli and Keller, 1972; Plato, 1974; and Rothenberg and Orost, 1969) report similar findings.

An understanding of conservation concepts is thus a reasonable indicator of attainment of intuitive preoperational thinking. Conserving children are likely to possess the conceptual faculties necessary for success in reading and mathematics in the early grades, as many of the studies cited above have shown. Furthermore, although SES-related effects on conservation attainment do occur, lasting understanding of conservation concepts can be taught. Piagetian conceptions of cognitive development thus deserve serious consideration in the Washington, D.C., Title I program.

The design for this conservation assessment study involved sampling randomly ten Title I and ten non-Title I students from each of 60 schools. Only first, second, and third grade students were included in the sample. An effort was made to sample males and females equally. Each child was tested individually using the Conservation Assessment Kit (CAK) developed for this study. The Kit measures five aspects of conservation ability: (1) conservation of two-dimensional space, (2) conservation of number, (3) conservation of continuous quantity, (4) conservation of substance, and (5) conservation of weight. The sample characteristics are described in Table 11.

Table 11. Sample Characteristics of 1,232 Students Responding to The Conservation Assessment Kit

	First grade		Second grade		Third grade	
	Male	Female	Male	Female	Male	Female
Non-Title I	96	114	77	124	87	110
Title I	99	108	97	103	107	110
Total	195	222	174	227	194	220

The Conservation Assessment Kit presents the child with eight problem situations involving some transformation such as flattening one of two equal balls of clay and asking the child if the amount of clay has been changed in the flattening process. One point is awarded for the correct answer to each of the eight questions. Another point is awarded for a logical response to the question "Why?" which always follows a correct response to the first question. Thus a child's score ranges from 0 to 16. For purposes of several analyses the scores were categorized into four groups: Nonconservers, 0-4; Low Conservers, 5-10; Good Conservers, 11-14; High Conservers, 15-16. Table 12 gives the percent of students classified as good or high conservers.

Table 12. Percent of Students in each Grade by Sex, by Program Type Category that are High or Good Conservers

	First grade		Second grade		Third Grade	
	Males	Females	Males	Females	Males	Females
Non-Title I	30	31	62	60	75	72
Title I	18	13	45	30	65	59

It is interesting to observe that Title I males are more likely to be conservers than Title I females, and that this pattern is opposite to the finding that Title I females outperform males on the achievement tests. Table 12 suggests that many children attain conservation skills between the end of first grade and the end of second grade. More than one-third of Title I children are still not conserving at the end of third grade.

The finding that non-Title I males and females do not differ significantly in the percent of conservers at each grade level but that Title I males and females do differ significantly raises an interesting question. If we interpret the conservation scores as indicative of the child's cognitive readiness level, then substantially more Title I males than females are not achieving in reading and math at the level expected from their cognitive readiness levels. Another way of stating this possibility is that some males have the cognitive readiness levels (cognitive concepts) to achieve in reading and math at a much higher level than they are performing. It seems likely that some other factors are more powerful determiners ot Title I males' achievement level than cognitive readiness as reflected in the CAK scores.

Table 13 contrasts the top two conserver groups termed "good conservers" with the bottom two groups termed "poor conservers" on Total Reading and Total Math. The results summarized in Table 13 illustrate the achievement disadvantage suffered by poor conservers. The differences are most pronounced between female good conservers and poor conservers; however, male good conservers are consistently higher in achievement than male poor conservers, and these relationships hold at each grade level for reading and math.

Table 13. Posttest Reading and Mathematics Achievement by Conservation Level

	Total Reading (G.E.)			Total Math (G.E.)		
	First grade	Second grade	Third grade	First grade	Second grade	Third grade
Good conservers						
Males	2.3(18)	2.9(28)	4.2(58)	2.3(19)	2.9(28)	4.2(58)
Females	3.0(25)	3.6(38)	4.5(63)	2.6(25)	3.2(38)	4.5(61)
Poor conservers						
Males	1.9(56)	2.6(31)	3.9(26)	1.8(60)	2.6(33)	3.8(26)
Females	2.0(69)	2.7(43)	3.3(25)	2.0(71)	2.6(43)	3.4(24)

Figure 6 presents a graphic illustration of the differences between Good Conservers and Poor Conservers.

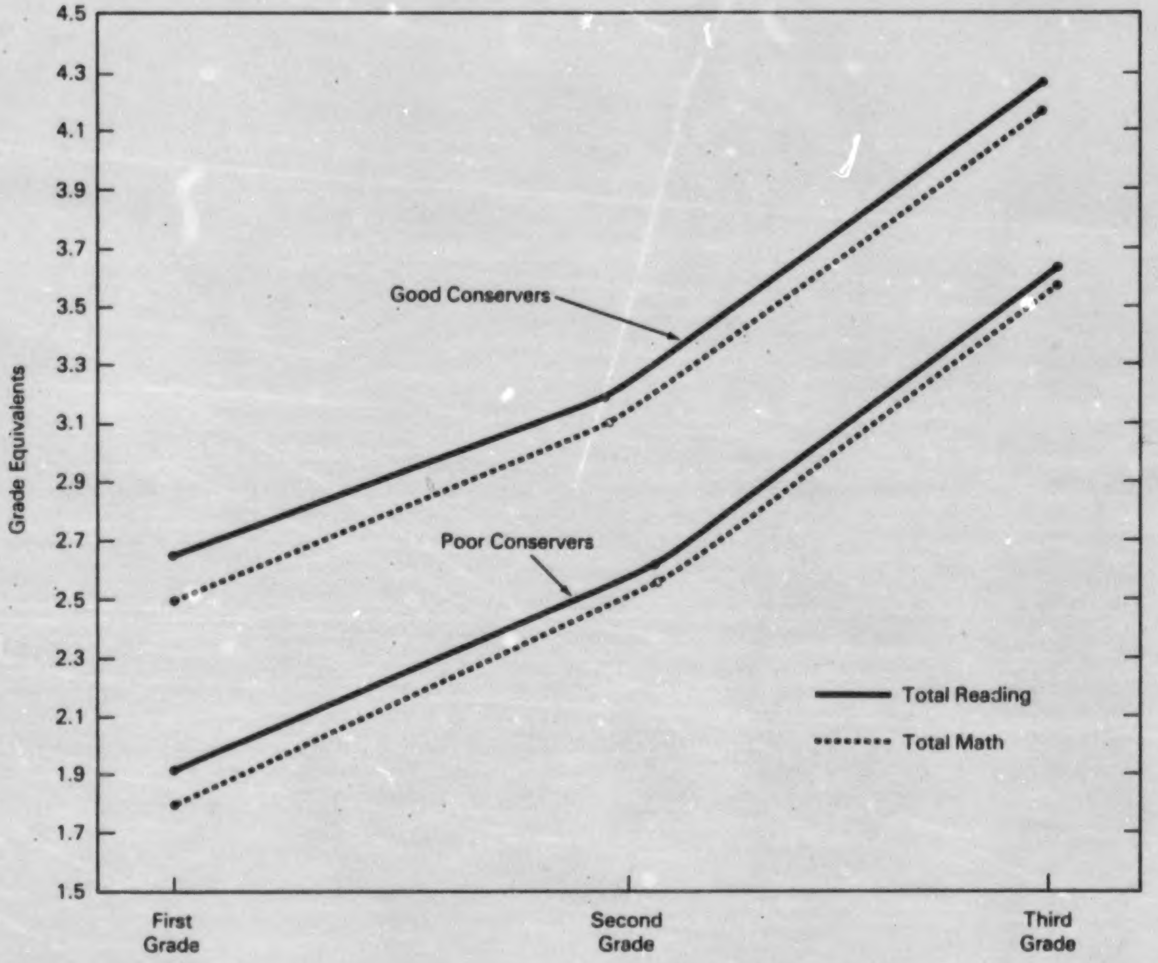


Figure 6. Contrasts between Good Conservers and Poor Conservers on Total Reading and Total Math

We turn now to a closer examination of the relationships between conservation and achievement. If the earlier conclusions regarding the influence of relation eduction ability or achievement are valid, then we would not only expect a correlation between achievement and conservation scores, but these correlations should vary with the extent to which relation eduction is called upon in the different achievement areas. For example, earlier we hypothesized that first grade reading comprehension is more of an associative process than first grade mathematics which entails greater use of relation eduction ability. An examination of the correlations in Table 14 seems to support this hypothesis.

Table 14. Correlations* between Conservation and Posttest Achievement Scores at Grades One, Two and Three

	Grade one $N = 177$	Grade two $N = 141$	Grade three $N = 174$
Vocabulary	.37	.30	.30
Comprehension	.20	.30	.28
Total Reading	.34	.33	.30
Math Computation	.38	.30	.30
Math Concepts	.40	.31	.35
Total Math	.41	.33	.37

*All correlations significant beyond the .05 level.

The conclusion reached earlier in the discussion that first grade reading comprehension requires less relation eduction ability than does reading comprehension at the other two grades, is supported by the evidence in Table 14. Likewise, the conclusion that mathematics relies more on relation eduction than reading comprehension or vocabulary is generally supported. The data relating conservation abilities to achievement is associational in nature and, consequently, there is danger in making causal inferences from such data. Recognizing this danger, it is still useful to consider the implications of a finding (as yet unsupported) that conservation ability stands as a determiner or causal influence on achievement in reading and math.

Typically, children acquire conservation abilities spontaneously, that is, there is no direct instruction or teaching of conservation concepts. The spontaneous acquisition of conservation concepts is one manifestation of developing relation eduction capacity. It seems highly likely that there is a minimum level of relation eduction ability required for any learning activity. For example, the concept of "regrouping" in mathematics normally presented in the latter half of the second grade requires an understanding of several relationships before mastery and understanding can be attained. A second grader can be taught the mechanics of "regrouping" and thus solve addition and subtraction problems requiring this operation without an understanding of the place value relationship which is critical in the "regrouping" concept. Recent research suggests that if children cannot conserve then they cannot educe (draw out or understand) the relationships involved in regrouping. If teachers persist in teaching nonconserving children the "regrouping" concept, the children will, after repeated presentations, master the mechanics but they will have no understanding of the "why" of the mechanical procedure they perform. Other concepts which first, second, and third graders are expected to learn require varying amounts of relation eduction ability. If any of these concepts are repeatedly presented to nonconserving children, they will respond associatively and, when possible, memorize the mechanics which lead to the correct answer. Such mechanics do not transfer to different applications, are easily forgotten, and like any mechanical repetitive process, are inherently nonmotivating.

If the above assumptions and conjectures are accepted, the problem seems clear. Title I children are being repeatedly exposed to concepts which are beyond the reach of their relation eduction ability. More intensive instruction with enrichment and supplementary materials probably does not increase the likelihood that the child will grasp the essential relationships inherent in a particular concept; it does increase the number of times the child is exposed to the concept, and thus supports the associative learning of mechanical procedures or stimulus response chains. Repetition, it should be realized, is the mainstay ingredient in associative learning. If a certain level of relation eduction ability is a prerequisite to normal progress through the curriculum, then we should be certain that the child has the requisite relation eduction ability before initiating learning activities. If a child does not possess the relation eduction capacity required for normal enjoyable progress through second grade, then attempts to teach the child second grade concepts will result in, at best, limited success while fostering frustration and low interest on the part of the child. If normal second grade concepts should not be presented to the nonconserving child, then what instruction *should* the child receive? It is with this question that we come face to face with a major theoretical issue in cognitive development. After reviewing our own and other research studies, we think it likely that relation eduction ability can be positively effected through special instructional activities designed specifically around critical cognitive concepts. If a relation eduction curriculum could be developed and piloted that interfaced with the ongoing curriculum, the potential payoff in increased achievement might be considerable. The present findings, coupled with past research, provide an excellent rationale for such a limited field experiment.

It should be emphasized that all learning cannot be accomplished eductively. For example, any symbol system, for example, the alphabet, is arbitrary, and thus must be learned associatively. However, with the exception of symbol systems, most learning in the elementary grades benefits from applied relation eduction. This fact is borne out by the finding that most third grade nonconservers are substantially below the Title I mean in reading and math achievement. A small number of third grade nonconservers is achieving near the mean of the Title I group, illustrating that an associative mode of learning does not always fail, but the probability remains high that a third grade nonconserver will be from one-half to a full year behind his conserving peers in reading and mathematics achievement.

CHAPTER VIII. BIRTH CHARACTERISTICS AND STUDENT PERFORMANCE

Following a review of recent research into the effects of low birth weight on children's school performance, a carefully designed study of a selected sample of low birth weight children was initiated. An unforeseen difficulty arose when the birth records for 75% of the sample were missing from the Public Health files. As a result, the findings reported here are only suggestive, and should be viewed as preliminary, pending replication. Some relationships discovered in other studies of children born prematurely were not found in this study, probably because of the severely restricted sample size. A brief review of some of the existing research on low birth weight will provide the necessary background against which the present study can be interpreted.

One of the longest and most carefully designed longitudinal studies on the effects of prematurity was conducted at the Johns Hopkins University Hospital. Five hundred babies weighing less than 2500 grams (the internationally recognized limit for prematurity), and 492 full-term controls were matched for race, season of birth, birth order, hospital of birth, and socioeconomic status. All babies were singletons, and those with IQ's below fifty or with severe sensory or motor deficits were excluded. The first examination was made at 40 weeks; three-quarters of the babies were seen between their 39th and 41st week (Knobloch, Rider, Harper, and Pasamanick, 1956). At that time, medical histories were taken, and neurological, Gesell Developmental, and physical examinations were made, and each child's intellectual potential was clinically estimated. Almost 90% of the full-term babies were neurologically normal, as were 77% of babies weighing between 1500 and 2500 grams. On the other hand, only half of the babies with birth weights less than 1500 grams were considered normal, and severe neurological impairment occurred much more often among these children. Approximately 12% of the smallest babies were severely impaired, in contrast to about one-half of one percent of the controls. There was a slight, but significant, difference between the percentage of the heavier prematures (1500-2500g) and controls, who were rated below normal in intellectual potential (2.4 percent vs. 4.3 percent), but a much greater incidence of subnormal intelligence occurred among the smaller prematures (19.4 percent). Furthermore, no infant weighing less than 2000g was rated as intellectually superior by the examiners. On the Gesell Developmental exam, premature blacks and whites scored similarly, when the discrepencies in body weight distribution were adjusted (Knobloch and Pasamanick, 1960). Among white babies, no developmental or intellectual differences related to socioeconomic status were reported; this analysis was not performed for blacks. Although sample sizes were too small to establish statistical significance, a relationship between the level of the mother's education and the gross motor performance of premature infants was found. Nevertheless, whether compared by subtest score or by performances on individual test items, control babies scored better than prematures in every case.

At ages 3 to 5, nine hundred of the previously examined children were again tested on the Gesell Developmental Scales and were rated for neurological health.[*] The revised Stanford Binet Form L was also administered, and a home interview was conducted to assess parental attitudes and socioeconomic status. The same patterns found at 40 weeks of age were repeated; the heavier prematures showed the least neurological impariment and a frequency of subnormal intelligence only slightly greater than the controls. Declines in the percentages of normal intelligence ratings occurred; these were more pronounced for blacks and were greater for prematures than for controls. For example at 40 weeks, the percentages of whites with normal IQ's were 98 for the controls and 96 for the prematures; these dropped to 94% and 84%, respectively, at ages 3 to 5.

At ages 6 to 7, the next round of testing was conducted (Wiener, Rider, Oppel, Fischer and Harper, 1965). Almost eight hundred children were studied; previous scores on the nonrespondents did not indicate an attritional bias. The Stanford Binet Form L, the Goodenough Draw-a-Person Test, the Lincoln-Oseretsky Test of Motor Development, and the Bender Gestalt Test of Visual-Motor Coordination were administered, and estimates of thinking mode (ability to comprehend instructions, abstractness of thinking, etc.) and speech maturity were made by a psychologist. Also, a social worker interviewed each family about socioeconomic variables and about the mother's child-rearing attitudes. An analysis of variance controlling for race and sex showed significant differences between controls and prematures for IQ, neurological status, motor development, Bender-Gestalt performance, speech maturity, and thinking mode. Nevertheless, when child-rearing attitudes, socioeconomic status, and a postpartum index of neurological damage were covaried, only the differences in Bender Gestalt and the thinking mode scores remained significant, and at lower levels than before. The effects of such personality traits as impulsiveness, hyperactivity, and anxiety were minimal. These results suggest that neurological defects mediate many of the difficulties experienced by children of low birth weight. A discriminant analysis of the test results identified the Bender Gestalt and thinking mode scores as the most effective separators of low birth weight and full-term children. Rank ordering the children by a combination of test scores weighted to differentiate the prematures from the controls, placed 50% of the controls, but only 20% of the prematures, among the top two hundred. Comparing the Stanford-Binet scores at ages 3-5 and ages 6-7 revealed very few changes—the distributions of IQ's were almost identical. Finally, the interrelationships of race, sex, birth weight and maternal attitudes to IQ, motor development, Bender Gestalt, and thinking mode variables were studied by partial correlation analysis. IQ related most closely to socioeconomic status, but the other three variables correlated highest with birth weight. When the neurological index was added and the results were reanalyzed, it correlated highest with all four variables, except IQ. In fact, the correlations of birth weight with IQ and with motor development disappeared. Neurological difficulties were, thus, strongly implicated among the causes of deficiencies in premature children. Disproportionate depression of test scores in lower class children did not occur. In no case was an interaction of socioeconomic status and low birth weight reported.

---

[*] Harper, Fischer, and Rider, 1959.

At ages eight to ten the next round of testing was completed on 822 of the original 992 subjects.* Ten substests of the Weschler Intelligence Scale for Children (WISC), the Wide Range Reading and Spelling Achievement Test, and the Bender Gestalt test were administered, and parents were interviewed. The proportion of low birth weight children whose IQ's indicated special educational or medical needs (IQ 50 to 79) was twice as large for control children, and three or four times as many blacks as whites were in this category, as well. Nevertheless, identifying many low birth weight children solely by test results was not possible. A composite score of the three test results was weighted to differentiate low birth weight and control children, and the two groups were ranked separately into sextiles. Although twice as many low birth weight children as controls fell into the lowest category, the score distributions overlapped considerably. As before, no interaction of social class with birth weight variables was found, nor did low birth weight children improve (catch up) in IQ as they grew older. When the index of neurological pathology was covaried with the achievement and aptitude subtests (socioeconomic status and emotional variables were covaried in each analysis), significant differences due to birth weight dropped from 16 of 20 subtests to 6 of 20. Again, neurological influences accounted for much of the effects previously allotted to low birth weight.

The final round of this study was carried out when the subjects were 12 to 13 years of age (Wiener, 1968). School records on academic performance and intelligence supplied the necessary data. Eighty-five percent of the original study population participated; children in special schools for the deaf, blind, or handicapped were not included in most analyses. Attainment of the grade appropriate for their ages varied significantly among birth weight groups; only 45% of those who weighed less than two thousand grams at birth were in the proper grade, as were 57% of the 2001 to 2500g group. On the other hand, 72% of the controls were in the grade appropriate for the age. Conversely, approximately twice as large a proportion of prematurely born children had attained grades 4 or 5 or were in special schools, when full-term children were in grade 7. Grade placement was not the only source of difference between prematures and controls, however.

Interestingly, several measures of academic achievement indicated greater impairment in arithmetic than in reading or spelling. The Metropolitan Achievement Tests given in the third grade showed a significant difference between controls and low birth weight children in arithmetic, although no such difference was found for reading skills. At ages eight to ten, relative performance on the arithmetic subscale of the WISC was much poorer than on the reading and spelling sections of the Wide Range Achievement Tests. The same trend occurred in school records on reading and mathematics achievement as well. An analysis of variance of reading and arithmetic achievement test scores indicated significant ($p<.001$) differences between birth weight groups, even when social class and neurological impairment scores were covaried. A multiple regression analysis was completed to isolate predictions of reading and mathematics achievement; social class, race, birth weight, and neurological scores were related to achievement in that order. Forty-nine percent of the total variance in reading scores, and 54% of the arithmetic score variance were explained by these variables taken together. These results indicated that low birth weight children encountered difficulties with arithmetic reasoning several years before impairment in reading developed. In addition, a strong effect of birth weight on these results, independent of perinatal neurological conditions, was discovered. Since prior waves of this study indicated that neurological difficulties seemed to mediate low birth weight effects in intellectual development, this finding is of particular interest.

---

*Wiener, Rider, Oppel, and Harper, 1968.

Because of the aforementioned problems in locating the birth records, only 109 second graders' birth records could be found and matched with standardized achievement results, Student Information Form data, and conservation scores. Of this sample of 109 second graders, 15, or 14% had birth weights below five pounds. Unfortunately, there is no way of estimating how representative these 109 students are of the total Washington, D.C., primary grades population. If we might indulge some conjecture and assume that the sample is representative, several rather staggering implications are apparent. For example, if the 14% estimate is accurate then there are almost 3,000 K-3 students in Title I eligible schools with birth weights below five pounds. Table 15 presents several comparisons between the full weight (> 5 lbs.) and low weight (< 5 lbs.) children.

Table 15. Comparisons Between Full Weight and Low Weight Second Grade Children on Conservation, Total Reading and Total Math

	Full weight > 5 lbs. *N* = 94	Low weight < 5 lbs. *N* = 15
Mean total reading (Post G.E.)	3.0	1.8
Mean total math (Post G.E.)	3.0	1.7
Percent Conserving	25	13

Because of the extremely small sample sizes, the results in Table 15 should be interpreted as suggestive of the types of problems attendent to low birth weight. Whether or not the magnitude of the difference between full weight and low weight children is as large as Table 15 indicates is a question the answer to which required a larger sample. If the Washington, D.C., Title I population includes large numbers of low birth weight children, and if these children are as scholastically deficient as Table 15 suggests they might be, then the Title I program is faced with a problem of substantial magnitude and far reaching implications. The previously presented literature review is consistent with the findings in Table 15 and supports the contention that low birth weight children have a very high probability of being cognitively and behaviorally immature. It is quite likely that low weight Title I eligible children and full weight Title I eligible children require two very different types of remediation. The low weight Title I child's neurological development is slower and, as such, traditional remediation approaches may not be successful, whereas the full weight Title I child, with normal neurological development, may benefit from the traditional approach with its emphasis on increased instructional intensity.

Two questions need to be answered before some of the above conjecture can be translated into a logical analysis of the implications. First, how many children in the Washington, D.C., Schools are low weight at birth (<5 lbs.)? Second, what are the behavioral concomitants of low birth weight? With these two questions answered an analysis is possible of the implications of various intervention strategies. One conclusion is inescapeable: If low birth weight is a prevalent condition, and if the cognitive deficiencies which accompany low birth weight are as substantial as past research suggests, then multiple agency intervention strategies are absolutely essential.

CHAPTER IX. COMPONENTS OF SUCCESS

One aspect of program evaluation which is given very little attention is the identification of processes (methods, materials, orientations) which are responsible for differential program effects. If one reading approach shows greater gains on nationally normed or criterion referenced reading achievement tests, then presumably the "whole program" is responsible. Imagine where medical science would be if pharmacologists accepted that a particular drug was effective and never asked why. The majority of program evaluations address the issue of outcomes and some look at the process, but seldom are the two empirically related.

Program evaluation can be subdivided into at least three major aspects: (1) product evaluation, (2) process evaluation, and (3) process/product evaluation. Product evaluation monitors the outcomes or effects of the program. Process evaluation monitors the strategies and procedures designed to change student or teacher behavior. Process/product evaluation explores the relationships among products and processes. Although often ignored, process/product evaluation is no less important than either product or process evaluation. In terms of questions to be answered, product evaluation asks: How are the students or teachers different after exposure to the new program? Process evaluation asks: What strategies differentiate the new program from traditional approaches, and were these strategies implemented? Process/product evaluation asks: What is the relationship between the strategies and the outcomes of the program?

Process evaluation is important because program managers need to know why a program worked just as much as they need to know how successful it was. The first and most difficult step in Title I process evaluation is to decide on what strategies are being implemented that discriminate one experimental classroom from another. By definition, an innovative educational program will possess characteristics that differentiate it from more traditional educational practices. These characteristics are the ingredients in the program's "recipe." If the recipe can be explicitly formulated, then it is likely that it can be replicated; however, more often than not, a program is judged successful in terms of the student outcome data, but the staff does not have the faintest idea of which dimensions of the program were responsible for success. Identification of the components or ingredients of program success is the goal of process/product evaluation.

In contrasting educational programs and classrooms, evaluations often identify the most salient characteristics of the programs, and subsequent successes or failures are attributed to these salient program features. For example, the difference between two reading programs is described as "linguistic" versus "phonetic" approach, or "small group" versus "tutorial". The designators "linguistic," "phonetic," "small group," and "tutorial" are accepted as sufficient for program comparison, despite the fact that there are undoubtedly dozens of more subtle differences (dimensions) between the approaches which are potentially more descriptive. Furthermore, the ways the approaches are alike receive little, if any, attention. This failure to go beyond simplistic, nominal designators or program descriptors contributes substantially to our inability to build a technology of instruction.

Program Structure Analysis (PSA) is a methodological tool, combining several analytical strategies, designed to empirically define the ways programs differ and to relate these differences to program outcomes. In the evaluation of the Washington, D.C., Title I program, three broad process domains were selected for study: (1) teacher knowledge of classroom management techniques, (2) teacher knowledge of teaching reading, and (3) teacher knowledge of teaching math.

Second and third grade teacher responses to each of the three process domains were related to student achievement gains in reading and math after adjusting for pretest contribution. The objective of this analysis was to determine whether teachers high in knowledge of teaching reading, knowledge of teaching math, and knowledge of classroom management techniques would be more successful in fostering reading and math achievement than teachers low in these knowledge areas. Because of small sample sizes, the conclusions must be tentative pending replication; however, in general, only small relationships are evident between the above-mentioned teacher characteristics and adjusted reading and math achievement. We will not dwell on this point further except to suggest that the study be replicated with an increased sample of teachers.

The failure to isolate the teacher strategies that predict student achievement replicates numerous other studies which have, likewise, failed to uncover significant relationships between teacher characteristics and student achievement. However, the fact is undeniable that some children achieve more in the Washington, D.C. Title I program than other children, and the question remains, why? What are the components of success? From the past chapters on student achievement, Piagetian conservation and birth characteristics, we can glimpse some insight into a partial answer. An explanation as to why certain children succeed and others do not requires going back to the circumstances surrounding a child's birth. As we have previously noted, low birth weight seems to be a primary contributor to later scholastic and behavioral problems. Likewise, children unable to "conserve" are at risk in that their relation eduction abilities are not mature enough for them to easily grasp normal first or second grade material. Failure, as judged by their teachers, peers, and themselves, contributes to fundamental feelings of inferiority and insecurity. Behavioral problems develop as responses to repeated failure, and these behavior problems, in turn, inhibit learning and the cycle continues gaining momentum with each additional week of school. The home and the general quality of out-of-school stimulation which the child receives are heavily implicated in this constellation of failure and self doubt. The program emphasis in 1975-76 on self concept development and concept development (e.g., conservation), with concomitant evaluation emphasis on these areas, should increase our understanding of the causes behind the success enjoyed by some children and the failure suffered by others. An answer to the "why" question has plagued educators for decades: the solution will not unfold in one brilliant flash of insight but, rather, will accumulate slowly as our understanding of children's growth and development increases.

Although a child's growth and development take place both in the structured environment of the school and in his home environment, this evaluation was not structured to directly measure the role played by the student's home environment; rather, several measures of his classroom environment were taken. These measures taken from the Teachers' Process Battery include the Classroom Environment Survey, Inservice Attitude Survey, and the Educator's Professional Values Scale. While these subscales of the Process Battery do not further illuminate the components of success for the Title I student, they do contain important information to the decisionmakers in the Title I program. These subscales are discussed in Chapter X.

CHAPTER X. INSTRUCTIONAL PROCESS ANALYSIS

The Teachers' Process Battery was administered on a school-by-school basis in the spring of 1975. The percentage of teachers responding was, for the most part, high and indicated a high degree of support for the Title I program. Seven hundred twenty (720) teachers responded, and what follows is a synthesis of their responses to the Battery.

The results of the Educator's Professional Values Scale indicate that the Title I teacher is a professional educator who believes that teachers have a profound influence on students, and that this influence is very important in molding children's future values and attitudes. The Title I teacher has a humanistic approach to education in that she believes strongly that children can be trusted to do the right thing and that children learn best in a classroom filled with love and emotional support. The teachers, however, do not agree that when given a choice, children will select what is best for them. This is in concert with the teachers' perception of their role as facilitators of values clarification.

There is little uncertainty on the question of what content emphasis is important to the Title I child from the teachers' point of view. The teachers responding to this question were split almost evenly over the role of basic skills in the schools. The tendency was to favor emphasis on the basic skills. In teaching the basic skills, however, no clear conclusion was evident in the responding teachers. Agreement, however, that a no-nonsense approach was effective seemed to increase by grade level. This trend is followed by the teacher perception that student respect is also coupled to a no-nonsense approach. This perception increased as the grade level increased. A clear majority of teachers agreed that keeping order in the classroom is necessary to effective teaching.

A majority of teachers disagreed with the statement that more attention should be paid to the slow learner than the fast learner, and that the fast learner can be left to his own devices to learn. This is a significant finding because it indicates a balanced approach to teaching with the teacher trying to meet the educational needs of all the students without neglecting any group.

The teachers responding strongly favored the idea of showing students that what they are learning relates to the other dimensions of their lives. In addition, at least 90% of the teachers favored a classroom testing program which would gauge their effectiveness and the progress of students.

As to the behavior problems that children exhibit in schools, most teachers felt that they could be traced to some factor in the home. The same majority, however, felt that educators' emotional growth expectations of the student were realistic.

The foregoing results of the Educator's Professional Values Scale have established the philosophical underpinnings of the Title I teacher as she views her own role and that of her students. What follows is the teachers' view of the process parameters of the Title I program.

Over 70% of the teachers had their programs implemented in their classrooms by the second month of the 1974-75 school year, with the majority of implementation occurring in the second month. What else do we know about the Title I teachers who responded to the survey? We know that very few teachers have made transfers from one class to another during the last year—only about 6%. Over 90% experienced no classroom transfer with its attendent turbulence. That most teachers have been in their present schools over three years, with the greatest turnover being in kindergarten and 7th grade, indicates that the Title I teacher represents an experienced, stable element in the Washington, D.C., Schools.

The tangible parameters of the classroom environment impinge on the quality and quantity of instruction available to the student. The teachers were asked, on the Process Battery, what kinds of items or procedures caused them problems and delays in program implementation (see Table 16). The problems in order of priority were:

Table 16. Teacher-Rated Problems in Program Implementation

	No. teachers responding
1. Lack of essential instruction materials;	317
2. Lack of materials for individualizing instruction;	269
3. School problems in scheduling classes;	220
4. Lack of other essential equipment;	185
5. School problems of selecting pupil participants;	140
6. Lack of listening devices;	138
7. Delay in assignment of pupils to teacher.	97

Lack of proper instructional materials and identification of eligible students seemed to be the most prevalent problems in program initiation.

The kinds of problems that Title I teachers were having during the school year which limited their effectiveness were:

	No. teachers responding
1. Lack of security (safe storage) for equipment;	340
2. Lack of adequate storage space for instruction materials;	274
3. Lack of sufficient instruction materials;	210
4. Lack of sufficient listening devices;	190
5. Lack of adequate floor space;	189
6. Lack of other essential equipment.	183

Listed in order of severity, the responses indicate that equipment and material problems still predominated the list of teacher concerns.

An identified class of equipment that was a problem both in program initiation and in the operating year was educational equipment, including audiovisual equipment. Teachers listed as the most important reasons for not using certain available pieces of equipment the following:

	No. teachers responding
1. Materials or programs pertaining to the use of some equipment are in short supply;	415
2. Equipment is often in need of repair or new parts;	302
3. Equipment is inconveniently stored and/or troublesome to set up.	269

When teachers did use audiovisual and educational equipment the most often used were the record player, the tape player, the overhead and the filmstrip projector, and the movie projector. The equipment that was least used were the learning machines and the reading pacers or similar devices.

As well as the physical environment of the classroom, the Title I teacher is able to employ, to varying degrees, aides and parents. The results on the Teacher Process Battery indicate that there are grade differences in the use and availability of aides according to grade. Table 17 indicates, by grade level, the availability of aides by numbers of days a week a teacher has an aid.

It seems significant that over half of the kindergarten teachers responding did not have any assistance from an aide at all. It also seems significant that the 75% of the seventh grade Title I teachers had an aide five days a week. The question that this data raises is whether the seventh grade aides could have been used more effectively in kindergarten in an early intervention role.

The teachers who did have an aide were asked to indicate how many hours a day they had an aide under their direction. The responses are presented by grade level because differences exist which confirm our previous information.

Table 17. Percent Responses by Grade Level

	K	1	2	3	7
N =	90	257	244	240	40
1 day	10.8	25.5	25.4	21.7	2.5
2 days	9.7	14.4	18.7	16.6	5.0
3 days	3.2	4.8	4.0	6.3	7.5
4 days	1.1	1.8	0.8	1.2	0.0
5 days	15.1	21.0	18.3	20.2	75.0
0 days	57.0	27.3	29.8	28.9	15.0

Table 18. Hours a Day Aide is Available

	The percent responses by grade level were				
	K	1	2	3	7
N	91	258	249	249	39
Hours.					
3 or more	18.3	12.2	11.1	13.0	70.0
2 but 3	1.1	5.9	6.0	4.3	2.5
1 but 2	0.0	5.9	4.4	5.5	2.5
Weekly but					
not daily	20.4	38.4	44.0	40.3	7.5
once per wk.	6.5	9.6	7.9	10.7	7.5
None	51.6	23.2	25.4	24.5	7.5

The difference of note again is between kindergarten and seventh grade.

The teachers who did have aides used them in various ways. The most common activities that teachers had aides perform every day were:

	No. teachers responding
1. Assisting pupils individually with learning tasks;	158
2. Distributing or collecting instruction materials;	152
3. Assisting pupils with minor behavior problems, individually;	135
4. Checking pupils' written work or updating progress charts or other records.	104
The activities that aides performed several times a week were:	
1. Reinforcing learning by conducting drills or games with pupils;	193
2. Helping prepare instruction materials;	145
3. Escorting pupils to and from the classroom.	135
The activities that aides were asked to perform several times a month were:	
1. Preparing or arranging bulletin boards or displays;	159
2. Setting up or operating audiovisual equipment.	125

Aides were seldom asked, according to the teachers, to supervise pupils outside the classroom. It is clear from the foregoing that the educational aide is heavily involved with the dynamics of the classroom and contributes to its success.

The parent also is involved, to a degree, in the Title I classroom. Parent involvement seems to increase with grade level, with fewer parents involved at the kindergarten level than at the seventh grade level. That more parents are involved however, in place of an aide in the kindergarten that at the seventh grade, is consistent with previous findings.

The preparation that teachers receive to perform their jobs does not end with their formal training. The Title I teacher is encouraged to use and is provided with sources of information which enable her to expand her professional horizon. In the Washington, D.C., Public Schools this takes several forms, but consists generally of the following categories: workshops, seminars, inservice courses, staff development days, consultant visitation, and faculty meetings. Teachers were asked to list which categories of inservice they had participated in. The results are presented in Table 19. Most highly attended over all grade levels were staff development days, workshops, and consultant visitations.

Table 19. Inservice Participation by Category — Given in Percents

	Grade Level				
	K	1	2	3	7
N	93	271	252	253	40
Workshops	79.6	78.2	76.6	79.4	92.5
Seminars	23.7	12.9	16.3	14.2	22.5
Inservice courses	40.9	30.3	32.1	32.8	47.5
Staff Development Days	91.4	91.9	93.3	88.9	90.0
Consultant Visitation	77.4	65.7	69.4	68.8	72.5
Title I Faculty Meetings	65.6	54.6	57.5	56.1	80.0

Teachers were also asked to rate these categories of inservice on a five-point utility scale. The results of that rating, for all teachers, are presented in Table 20. It is clear from both the raw data and the synthesized data in Table 20 that inservice courses were not well received by the Title I teachers. The reasons for this are not clear at this time and will be the target of further investigation in the 1975-76 evaluation.

The following table indicates the general rating overall. Teachers were asked to respond in accordance with the following scale: If you strongly agree, write 1; If you agree, 2; If you are undecided, 3; If you disagree,4; If you strongly disagree, 5. Results are presented by mean response over number of teachers responding. Total number of teachers responding was 720.

Table 20. Total Teacher Response to Inservice Attitude Scale

	Workshops	Seminars	Inservice courses	Staff development days	Consultant visitation	Title I faculty meetings
1. The topics covered have been relevant to my needs.	1.93 545	1.79 528	3.81 481	2.13 530	2.05 505	2.14 509
2. In my opinion, the leaders have been, generally, quite well prepared.	2.23 92	1.88 100	3.74 102	2.30 100	2.01 93	2.40 95
3. Considering our other duties, we have spent too much time in this type of activity.	1.75 220	1.86 224	3.09 260	1.88 221	2.02 210	1.98 220
4. I believe the activities I have attended have made me more effective with the children.	2.28 577	1.97 566	3.48 526	2.47 557	2.09 539	2.35 530
5. Generally speaking, the facilities for the sessions have been adequate.	2.08 432	1.88 434	3.72 388	2.22 422	2.06 397	2.48 358
6. In general, I am pleased with the program to date.	1.92 346	1.97 338	3.67 314	2.31 325	2.00 325	1.99 331

The Title I teachers were also asked to list their preference as to the number of meetings by category they would like. They were also asked how long, by category, these meetings should last. The responses to each question are as follows:

Table 21. Inservice Participation and Preferences

	Workshops	Seminars	Inservice courses	Staff development days	Consultant visitation	Title I faculty meetings
1. How many would you like per month?	1	1	1	1	1	1
2. How long (in minutes) should each session last?	60/120	60/120	60/120	60/120	30/60	30/60

In summary, the Title I teacher is a well trained, determined, professional teacher who has some concerns about the physical makeup of her classroom. She also has very definite ideas about what works in the classroom and what she needs to improve her performance.

CHAPTER XI. COMPETITIVE PARTNERSHIP COMPARISONS

COST EFFECTIVENESS ANALYSIS

Introduction

The Competitive Partnership (CP) program is a joint school/industry effort to test the effectiveness of various publishers' programs with Title I students. Publishers of reading and mathematics programs were asked to submit proposals to the schools. The schools reviewed the publishers' programs and proposals and selected the programs of four publishers in reading and mathematics, as follows:

Publisher	Reading	Mathematics
D.C. Heath	X	X
Random House	X	X
McGraw-Hill	X	
Addison-Wesley		X

The CP program analysis is being conducted for public elementary schools, grades 1 through 3. Public secondary schools may participate in the CP program at a later time. Nonpublic schools are not participating in the CP program. The analysis presented here is for the three years 1972-73, 1973-74 and 1974-75.

The programs emphasize individualized instruction. Pamphlets, workbooks, teaching aids, games, etc., are included for use with individual students or small groups. Each student can work at his own pace under the guidance and supervision of the teacher. Some programs provide their own tests and student progress records.

COST EFFECTIVENESS MODELS

Cost effectiveness analysis is an analytic decision making procedure which compares the costs of alternatives with measures of their effectiveness in order to provide decision makers with relevant information on which to make decisions. In the present case, costs are the costs of the CP programs in reading and mathematics. Effectiveness is measured by standardized test scores in reading and mathematics. Within this framework, other variables may be taken into account that lend more precision and sophistication to the analysis. The cost analysis in this report provides an analysis by grade in terms of annual per student costs. This analysis is more precise than the analyses presented in the two earlier reports. (The data in this report is for all three years of the CP and supercedes the cost analyses data presented in the two earlier reports).

Effectiveness in all three years is measured in terms of gains in Grade Equivalent Scores (months of gain). However, to control for the contribution of extraneous variables, analyses for 1972-73 used the analysis of covariance method while the 1973-74 evaluation used the Context, Input, Process, Product (CIPP) Model. The analysis of covariance is a statistical method that attempts to "control" the data for variables outside the control of (or extraneous to) the experimenter, especially those which, in addition to the experimental variable, may affect the outcome variable. By controlling these extraneous variables the true contribution of the experimental variables to the outcome (standardized test results) is more clearly understood.

The Context, Input, Process, Product (CIPP) model was used as the analytic model for cost effectiveness analysis in the 1973-74 report. This model, in contrast with simpler conceptions of cost effectiveness, formulates effectiveness measures as part of a process of overall program development. Context variables consider the background of objectives, goals, and constraints within which various decisions are made. *Input* variables consider the relative costs, program characteristics, staff development efforts, staff qualifications and related Title I programs, materials, and services. *Process* variables include program and service utilization, delivery and continuity, and teaching practices. *Product* variables are measured in the form of standardized test data.

The CIPP model makes allowances for the fact that cost effectiveness analyses are often carried out under practical field conditions and that it is not always possible to "control" or "hold constant" the many variables that may effect the final results. To the practical decision maker it is often just as important to know the differences in context, input, and process as it is to measure the final product. Such analysis provides clues as to the possible reasons that one program may seem more cost effective than another. The resulting analysis produces an effectiveness *profile* rather than a single measure of effectiveness.

Both of these models were considered for the current analysis. However, since there were differences in the data-gathering instruments used each year, the analyses are not directly comparable for all three years of the program.

COST ANALYSIS

The purpose of the cost analysis is to express costs as an index comparable among CP programs. CP costs were annualized for each grade (K, 1, 2 and 3) and are presented on the basis of annualized per student costs, a concept parallel to per pupil expenditures. The analysis by grade was carried out so that cost effectiveness comparisons could be made for grades 2 and 3, the only grades for which Grade Equivalent gain scores are available on the standardized tests. Grade 1 uses only a posttest, which is not as suitable as a gain score for measuring effectiveness. A standardized achievement test is not used in kindergarten.

Cost data for all three years was provided by the Washington, D.C. Public Schools. The cost data was obtained directly from purchase orders issued to the participating CP suppliers.

Tables 22 and 23 show the breakdown of costs for reading and mathematics respectively. This analysis is for the instructional materials. Costs are categorized as consummables and nonconsummables and by grade (K, 1, 2, and 3). Consummables include the costs of workbooks, tests, and other materials that are used by the students themselves and have to be reordered frequently. Certain materials such as tests, answer sheets, workbooks, pamphlets, and handouts may have to be reordered annually in order to maintain an adequate supply. These are the costs required to replace used up materials each year. Nonconsummables include the costs of teachers' manuals, maps, charts, hardbound books, and the like which are likely to be reused for an extended number of years. These are materials that do not wear out easily and/or are not distributed to students. However, sooner or later these materials will require replacement because the content or presentation may become out-of-date or they are no longer usable for effective teaching.

Categorization of the materials as consummables or nonconsummables was carried out by staff of the Title I Office. Categorization by grade presented some difficulties and, as a result, grade categories are probably not as reliable as the consummable versus nonconsummable categorization. Specifically, while six of the nine purchase orders in reading designated the grades for which the materials were ordered, grade information had to be reconstructed from other sources for the remaining three purchase orders (D.C. Heath for 1972-73 and 1973-74, and McGraw-Hill for 1974-75). This problem was not encountered in the mathematics programs. If cost analyses of this type are to be carried out in the future, it would be appropriate to include the grades for which they were ordered on all of the purchase orders.

It should be noted that the costs presented in these tables represent negotiated discounted costs of 20% to 25% on selected materials and not the actual list price for the materials. Undoubtedly, the discounts negotiated with each of the suppliers made a substantial difference in the cost effectiveness of the program.

Tables 22 and 23 show that about $890,000 was spent on reading programs and about $390,000 on mathematics programs during the three-year period. In reading, about $402,000 (45%) was spent with the McGraw-Hill Company, while the remainder was divided almost evenly between D.C. Heath and Random House. According to Title I personnel, substantial purchases had been made prior to 1972-73 from McGraw-Hill, while Random House entered the CP arena after the start of the 1972-73 school year. These facts should be kept in mind in terms of their potential impact on the cost effectiveness results.

In mathematics the largest expenditures for the three years were with D.C. Heath ($177,782 or 49%). Addison-Wesley and Random House did not actually start in the CP program until 1973-74.

Table 22. Cost Analysis - Reading Programs - Instructional Materials

					Costs by Grade		
					K		
School year	Supplier Contractor	Total Costs-instructional materials	Total Costs-consummable materials	Total Costs non-consummable materials	Total	Consum-mables	Non-consum-mables
		$	$	$	$	$	$
'72-73	D.C. Heath	112,709	20,176	92,534	10,578	1,770	8,808
	McGraw-Hill	142,912	133,732	9,180	674	51	622
	Random House	56,535	29,979	26,556	6,625	4,338	2,288
'73-74	D.C. Heath	54,162	40,664	13,498	3,667	2,548	119
	McGraw-Hill	113,318	65,208	48,110	7,224	5,096	2,128
	Random House	89,327	47,753	41,574	4,672	2,684	1,988
'74-75	D.C. Heath	74,219	46,747	27,472	4,264	3,920	344
	McGraw-Hill	145,653	132,752	12,900	4,046	3,427	619
	Random House	103,322	86,591	16,730	13,102	11,798	1,304
Total	D.C. Heath	241,090	107,587	133,503	18,508	8,237	9,271
Three	McGraw-Hill	401,883	331,692	70,191	11,944	8,574	3,369
Years	Random House	249,183	164,323	84,861	24,399	18,819	5,579

Note. All figures rounded to nearest dollar. Consummable + Non-consummable = Total.

Table 22. Cost Analysis - Reading Programs (Contd.)

		Costs by Grade								
		1			2			3		
School year	Supplier Contractor	Total	Consum-mables	Non-consum-mables	Total	Consum-mables	Non-consum-mables	Total	Consum-mables	Non-consum-mables
		$	$	$	$	$	$	$	$	$
'72-73	D.C. Heath	31,870	7,471	24,400	42,366	4,095	38,271	27,895	6,840	21,055
	McGraw-Hill	1,415	905	510	89,048	85,045	4,003	51,776	47,776	4,045
	Random House	14,808	7,741	7,067	13,944	9,773	4,170	21,157	8,126	13,031
'73-74	D.C. Heath	30,318	21,886	8,431	11,748	8,595	3,153	8,430	6,635	1,795
	McGraw-Hill	32,892	16,732	16,161	38,785	23,493	15,293	34,416	19,887	14,529
	Random House	25,023	13,732	11,292	36,703	17,322	19,382	22,928	14,016	8,913
'74-75	D.C. Heath	31,958	20,483	11,475	21,060	12,412	8,648	16,937	9,933	7,004
	McGraw-Hill	15,574	11,819	3,755	76,767	72,423	4,344	49,266	45,083	4,182
	Random House	39,392	32,622	6,770	29,240	25,126	4,114	21,588	17,046	4,542
Total	D.C. Heath	94,146	49,840	44,306	75,174	25,102	50,072	52,262	23,407	29,855
Three	McGraw-Hill	49,882	29,456	20,426	204,600	180,961	23,639	135,458	112,701	22,756
Years	Random House	79,223	54,095	25,129	79,888	52,220	27,666	65,674	39,187	26,486

Note. All figures rounded to nearest dollar. Consummable + Non-consummable = Total.

Table 23. Cost Analysis - Mathematics Programs - Instructional Materials

School year	Supplier Contractor	Total Cost-instructional materials	Total Costs-consummable materials	Total Costs non-consummable materials	Costs by Grade K Total	Costs by Grade K Consummables	Costs by Grade K Non-consummables
		$	$	$	$	$	$
'72-73	Addison-Wesley			Not Used			
	D.C. Heath	93,393	31,973	61,420	10,669	4,104	6,565
	Random House	Random House materials for 1972-73 were distributed in 1973-74 due to late delivery. Costs for 1972-73 are combined with 1973-74.					
'73-74	Addison-Wesley	85,809	31,364	54,445	7,703	2,235	5,468
	D.C. Heath	24,078	21,856	2,222	5,898	5,882	16
	Random House	45,961	21,868	24,093	4,109	2,726	1,382
'74-75	Addison-Wesley	27,356	20,509	6,847	3,212	1,554	1,659
	D.C. Heath	60,310	59,266	1,044	4,256	4,102	154
	Random House	22,792	12,842	9,949	1,913	1,907	6
Total Three Years	Addison-Wesley	113,165	51,874	61,292	10,915	3,789	7,127
	D.C. Heath	177,782	113,095	64,686	20,823	14,088	6,735
	Random House	68,753	34,710	34,043	6,021	4,633	1,388

Note. All figures rounded to nearest dollar. Consummable + Non-consummable = Total.

Table 23. Cost Analysis - Mathematics Programs (Contd.)

School year	Supplier Contractor	Costs by Grade 1 Total	Costs by Grade 1 Consummables	Costs by Grade 1 Non-consummables	Costs by Grade 2 Total	Costs by Grade 2 Consummables	Costs by Grade 2 Non-consummables	Costs by Grade 3 Total	Costs by Grade 3 Consummables	Costs by Grade 3 Non-consummables
		$	$	$	$	$	$	$	$	$
'72-73	Addison-Wesley					Not Used				
	D.C. Heath	37,267	11,950	25,318	26,987	12,043	14,944	18,470	3,876	14,594
	Random House	Random House materials for 1972-73 were distributed in 1973-74 due to late delivery. Costs for 1972-73 are combined with 1973-74.								
'73-74	Addison-Wesley	20,235	10,356	9,879	23,813	10,488	13,326	34,057	8,286	25,772
	D.C. Heath	7,569	7,499	70	6,422	4,464	1,957	4,190	3,011	179
	Random House	8,938	7,003	1,935	9,802	7,515	2,267	23,133	4,624	18,509
'74-75	Addison-Wesley	6,071	5,548	523	9,989	6,652	3,337	8,084	6,756	1,328
	D.C. Heath	20,367	20,152	216	18,487	18,263	223	17,200	16,750	451
	Random House	4,485	4,419	67	13,307	4,623	8,684	3,086	1,894	1,193
Total Three	Addison-Wesley	26,306	15,904	10,402	33,803	17,140	16,663	42,141	15,042	27,100
	D.C. Heath	65,203	39,600	25,603	51,896	34,771	17,125	39,860	23,636	15,223
	Random House	13,423	11,421	2,002	23,089	12,138	10,951	26,219	6,518	19,702

Note. All figures rounded to nearest dollar. Consummable + Non consummable = Total.

Tables 24 and 25 show the percentage distribution of costs by grade for reading and mathematics respectively. These tables show that expenditures were not distributed equally among grades K through 3. Expenditures were generally lowest for kindergarten students.

Table 24. Reading Programs - Percent Costs by Grade

School year	Supplier Contractor	Grade			
		K	1	2	3
'72-73	D.C. Heath	9.4	28.3	37.6	24.7
	McGraw-Hill	0.5	0.9	62.4	36.2
	Random House	11.7	26.2	24.7	37.4
'73-74	D.C. Heath	6.8	56.0	21.7	15.5
	McGraw-Hill	6.4	29.0	34.2	30.4
	Random House	5.2	28.0	41.1	25.7
'74-75	D.C. Heath	5.7	43.1	28.4	22.8
	McGraw-Hill	2.8	10.7	52.7	33.8
	Random House	12.7	38.1	28.3	20.9
All three years	D.C. Heath	7.7	39.0	31.2	22.1
	McGraw-Hill	3.0	12.4	50.9	33.7
	Random House	9.8	31.7	32.1	26.4

Table 25. Mathematics Programs - Percent Costs by Grade

School year	Supplier Contractor	Grade			
		K	1	2	3
'72-73	Addison-Wesley	Not Used			
	D.C. Heath	11.4	39.9	28.9	19.8
	Random House	—	—	—	—
'73-74	Addison-Wesley	8.9	23.6	27.8	39.7
	D.C. Heath	24.5	31.4	26.7	17.4
	Random House	11.7	12.1	19.1	57.1
'74-75	Addison-Wesley	12.0	22.2	36.4	29.4
	D.C. Heath	7.1	33.8	30.7	28.5
	Random House	8.4	19.7	58.4	13.5
All three years	Addison-Wesley	9.7	23.2	29.9	37.2
	D.C. Heath	11.7	36.7	29.2	22.4
	Random House	8.8	19.5	33.6	38.1

Tables 26 and 27 show the cost analysis for staff development services. Staff development services were retained from each supplier in order to provide teachers with training and consultation on the most effective use of the instructional material. These costs are in addition to the costs of the instructional materials.

Table 26 shows that D.C. Heath had the highest staff development costs in all years for reading. The staff development costs for McGraw-Hill and Random House were about equal.

Table 26. Staff Development Costs - Reading

School year	Supplier Contractor	Costs	Number of staff and parents trained	Average trainee cost
		$		$
1972-73 & '73-74[1]	D.C. Heath	18,500	200	92.50
	McGraw-Hill	17,500[2]	635	27.56
	Random House	16,612	300	55.37
1974-75	D.C. Heath	200,000		
	McGraw-Hill	6,000	Data not available	
	Random House	6,820		
All years	D.C. Heath	38,500	–	–
	McGraw-Hill	23,500	–	–
	Random House	23,432	–	–

[1] 1972-73 and 1973-74 are combined because 1972-73 contracts were started late in the school year and would have their impact in 1973-74.

[2] Gratuity from company of $9000.

Table 27. Staff Development Costs - Mathematics

School year	Supplier Contractor	Costs	Number of staff and parents trained	Average trainee cost
		$		$
1972-73 & '73-74[1]	Addison-Wesley	20,000	357	56.02
	D.C. Heath	38,500	500	77.00
	Random House	22,442	275	81.61
1974-75	Addison-Wesley	15,416		
	D.C. Heath	25,000	Data not available	
	Random House	8,920		
All years	Addison-Wesley	35,416	–	–
	D.C. Heath	63,500	–	–
	Random House	31,362	–	–

[1] Only D.C. Heath was in operation in 1972-73.

In mathematics (Table 27) D.C. Heath had the highest staff development costs, almost twice as much as Addison-Wesley and Random House.

PER STUDENT COSTS

Per student costs for instructional materials (for each year and grade) are obtained by the formula:

$$\text{Per Student Costs} = \frac{(\text{Consummables} + (\text{Non-consummables} \div 5))}{\text{Students Served}}$$

Non-consummables are divided by 5 representing five years of useful life until they would be worn out or replaced by more up-to-date materials. Five years is the period of useful life used by D.C. Public Schools in planning the ordering of new texts and instructional materials. Consummables, on the other hand, are reordered each year so that their costs are incurred annually. The per student costs for instructional materials presented in Tables 30 and 31 were calculated from the cost data in Tables 22 and 23 and the number of students served in Tables 28 and 29.

Table 28. Number of Students Served - Reading Programs

School year	Supplier Contractor	Total	By grade			
			K	1	2	3
1972-73	D.C. Heath	2,341	468	680	630	563
	McGraw-Hill	4,580	620	1,120	1,560	1,280
	Random House	1,360	180	420	380	380
		8,281	1,268	2,220	2,570	2,223
1973-74	D.C. Heath	1,919	462	492	494	471
	McGraw-Hill	3,835	435	980	1,200	1,220
	Random House	2,560	360	880	800	520
		8,314	1,257	2,352	2,494	2,211
1974-75	D.C. Heath	1,625	345	420	450	410
	McGraw-Hill	4,380	735	1,290	1,185	1,170
	Random House	2,520	300	820	780	620
		8,525	1,380	2,530	2,415	2,200
Total three years	D.C. Heath	5,885	1,275	1,592	1,574	1,444
	McGraw-Hill	12,795	1,790	3,390	3,945	3,670
	Random House	6,440	840	2,120	1,960	1,520
		25,020	3,905	7,102	7,479	6,634

Source: Title I Office.

Table 29. Number of Students Served - Mathematics Programs

School year	Supplier Contractor	Total	By grade			
			K	1	2	3
1972-73	Addison-Wesley			Not Used		
	D.C. Heath	10,400	3,200	3,180	3,180	840
	Random House			Not Used		
1973-74	Addison-Wesley	4,700	860	1,380	1,040	1,420
	D.C. Heath	6,620	1,520	1,800	1,920	1,380
	Random House	4,980	1,240	1,300	1,320	1,120
		16,300	3,620	4,480	4,280	3,920
1974-75	Addison-Wesley	4,400	880	1,060	1,040	1,420
	D.C. Heath	5,040	1,080	1,480	1,200	1,280
	Random House	4,260	680	1,160	1,220	1,200
		13,700	2,640	3,700	3,460	3,900
Total three years	Addison-Wesley	9,100	1,740	2,440	2,080	2,840
	D.C. Heath	22,060	5,800	6,460	6,300	3,500
	Random House	9,240	1,920	2,460	2,540	2,320
		40,400	9,460	11,360	10,920	8,660

Source: Title I Office.

Table 30. Per Student Costs - Reading Programs Instructional Materials

School year	Grade	Supplier - Contractor		
		D.C. Heath	McGraw-Hill	Random House
1972-73	K	4.16	0.28	26.64
	1	18.16	0.90	21.80
	2	18.65	55.03	27.91
	3	19.63	37.92	28.24
	All	16.52	29.60	25.94
1973-74	K	5.57	12.69	8.56
	1	47.91	20.37	18.17
	2	18.68	22.13	26.50
	3	14.85	18.68	30.38
	All	22.60	19.51	21.90
1974-75	K	11.56	4.83	40.20
	1	54.23	9.74	41.43
	2	31.43	61.85	33.27
	3	27.64	39.25	28.96
	All	32.15	30.90	35.69
All years	K	7.92	5.17	23.73
	1	36.87	9.89	27.89
	2	22.31	47.07	29.47
	3	20.34	31.95	29.27
	All	22.82	27.02	28.15

Table 31. Per Student Costs - Mathematics Programs Instructional Materials

School year	Grade	Supplier - Contractor		
		Addison-Wesley	D.C. Heath	Random House
1972-73	K	Not Used	1.69	Not Used
	1		5.04	
	2		4.73	
	3		8.09	
	All		4.26	
1973-74	K	3.87	3.87	2.42
	1	8.93	4.17	5.68
	2	12.65	2.52	6.04
	3	9.46	2.21	7.43
	All	8.99	3.37	5.36
1974-75	K	2.14	3.83	2.81
	1	5.33	13.65	3.82
	2	7.04	15.26	5.21
	3	4.94	13.16	1.78
	All	4.97	11.80	3.48
All years	K	3.00	2.66	2.56
	1	7.37	6.92	4.81
	2	9.84	6.06	5.64
	3	7.20	7.62	4.51
	All	7.05	5.71	4.49

The results for reading in Table 30 show that D.C. Heath tends to be the least expensive program (all years combined) for all grades combined and in grades 2 and 3. However, D.C. Heath is the most expensive program in the first grade. McGraw-Hill is the most expensive program in grades 2 and 3, but the least expensive program in kindergarten and grade 1. Random House costs tend to be intermediate and are more evenly distributed among the grades.

Perhaps most notable about the results is the large variability in per student costs by year and grade. Although D.C. Heath has the lowest per student cost in 1972-73 and for all three years combined, it shows the highest per student cost in 1973-74 and the second highest in 1974-75. As indicated earlier, however, classification of costs to grades for D.C. Heath in 1973-74 and in 1974-75 and McGraw-Hill in 1974-75 may not be fully reliable because the classification was based on secondary information.

The results for mathematics in Table 31 show that Random House mathematics programs are the least expensive at all grades in 1974-75 and for the three years combined. Although per student costs for D.C. Heath mathematics programs were the lowest in 1973-74, a large increase in 1974-75 (2 to 3 times the cost of Addison-Wesley and Random House) increased its costs for all years. Addison-Wesley was the most expensive program in per student costs for all years, and for 1973-74.

Per student costs of staff development are obtained by the formula:

$$\text{Per Student Costs Staff Development} = \frac{\text{Costs-S-D-} \div 5}{\text{Students Served}}$$

Where, Costs of S-D- are those given in Tables 26 and 27; 5 is the number of years of usefulness of staff training, allowing for staff turnover and the need for renewed training brought about by the adoption of new materials; and students served are those given in Tables 28 and 29.

Per student staff development costs could not be analyzed by grade as the appropriate information was not obtained. The per student costs given in Tables 32 and 33 are for the school year irrespective of grade. Tables 32 and 33 also give the total per student costs and the costs for instructional materials.

The results for reading in Table 32 show that D.C. Heath had the highest per student costs for staff development ($1.31 for all years) and McGraw-Hill had the lowest per student costs ($0.37 for all years.) However, the total per student costs were not changed much by the addition of staff development costs to instructional materials costs. D.C. Heath continued to have the lowest per student costs in 1972-73, 1973-74 and all years, and the second highest costs in 1974-75. D.C. Heath's higher position in staff development costs simply served to reduce the differences in costs with the McGraw-Hill Reading Program and the Random House Reading Program.

Table 32. Total Per Student Costs - Reading Programs Instructional Materials Plus Staff Development Costs

	Supplier - Contractor								
	D.C. Heath			McGraw-Hill			Random House		
School year	Instructional materials	Staff development	Total	Instructional materials	Staff development	Total	Instructional materials	Staff development	Total
1972-73 & 1973-74[1]	19.56	0.87	20.43	24.56	0.42	24.98	23.92	0.85	24.77
1974-75	32.15	2.46	34.61	30.90	0.27	31.17	35.69	0.54	36.23
All years	22.82	1.31	24.13	27.02	0.37	27.39	28.15	0.73	28.88

[1] Data combined for the two-year period to conform to staff development cost data format

In mathematics (Table 33) Addison-Wesley had the highest staff development costs for all years combined ($0.78) and D.C. Heath had the lowest staff development costs per student for all years ($0.58). However, it should be noted that D.C. Heath's staff development costs in 1974-75 were almost double their costs for the two prior years and were almost twice those of Random House. A similar observation can be made for total costs with D.C. Heath's costs in 1974-75 being more than twice as much as those of Addison-Wesley and more than three times as much as those of Random House.

Table 33. **Total per Student Costs - Mathematics Programs Instructional Materials plus Staff Development Costs**

	Supplier - Contractor								
	D.C. Heath			McGraw-Hill			Random House		
School year	Instructional materials	Staff development	Total	Instructional materials	Staff development	Total	Instructional materials	Staff development	Total
1972-73 & 1973-74[1]	8.99	0.85	9.84	3.82	0.45	4.27	5.36	1.05	6.41
1974-75	4.97	0.70	5.67	11.80	0.99	12.79	3.48	0.42	3.90
All years	7.05	0.78	7.83	5.71	0.58	6.29	4.49	0.68	5.17

[1] Data combined for the two-year period to conform to staff development cost data format.

EFFECTIVENESS — STANDARDIZED TEST RESULTS

Reading

The results of the standardized tests for all three years are given in Tables 34 and 35. Detailed analyses for the current year (1974-75) are presented in Chapter VI and will not be repeated here. The data for grade 1 are average (mean) grade equivalent posttest scores and should be interpreted cautiously as posttests are not a fully adequate measure of program impact. Data for grades 2 and 3 are average (mean) grade equivalent gain scores. The number of students served represents the entire population of students using each program in a given year. The number of students served is used to obtain a weighted average score for each grade.

The results for reading in Table 34 show that in grade 1, Random House had the highest mean posttest scores, D.C. Heath had the lowest scores, and McGraw-Hill had intermediate results; in grade 2 McGraw-Hill had the best results, followed by D.C. Heath and Random House; and in grade 3, Random House had the best results, followed by McGraw-Hill and D.C. Heath.

Several other observations can be made from this table. First, in terms of gain scores, the results for grade 2 are much better than for grade 3, particularly for McGraw-Hill and D.C. Heath (average of .93 for grade 2 versus .67 for grade 3 for D.C. Heath; 1.01 for grade 2 versus .78 for grade 3 for McGraw-Hill; and .89 for grade 2 and .85 for grade 3 for Random House). Title I staff need to give further attention to improving the performance of third grade students in reading.

Second, if .80 grade equivalent gain is considered to be an acceptable level, based on an 8-month testing period (from September to May), then all CP reading programs reach this level in the second grade. However, in the third grade, only Random House and McGraw-Hill reach .80 grade equivalent gain, and then, only in school year 1974-75.

Results of the posttests in the first grade show a high degree of variability from year to year as well as among programs, suggesting that the posttests may reflect the quality and preparation of the students coming into the schools served by each program more than the impact of each CP reading program. In general, posttest results for grade 1 were highest in 1972-73, declined in 1973-74 and rose again in 1974-75. Except for McGraw-Hill and Random House in 1972-73, posttest results for grade 1 are far behind grade level with deficits ranging from about 2½ to 5½ months. These results suggest giving greater attention to the first grade in order to avoid problems in the future.

Table 34. Reading - Grade Equivalent Results by Grade and Year

Grade	D.C. Heath Grade equivalent	D.C. Heath Students served	McGraw-Hill Grade equivalent	McGraw-Hill Students served	Random House Grade equivalent	Random House Students served
Grade 1 - Posttest						
1972-73	1.50	680	1.90	1120	1.90	420
1973-74	1.45	492	1.45	980	1.60	880
1974-75	1.58	420	1.64	1290	1.76	820
Average - all years	1.51	1592	1.67	3390	1.72	2120
Grade 2 - Gains						
1972-73	0.90	630	0.90	1560	0.80	380
1973-74	0.88	494	1.04	1200	0.89	800
1974-75	1.03	450	1.12	1185	0.93	780
Average - all years	0.93	1574	1.01	3945	0.89	1960
Grade 3 - Gains						
1972-73	0.60	563	0.40	1280	0.30	380
1973-74	0.77	471	0.77	1220	0.78	520
1974-75	0.57	410	0.80	1170	0.91	620
Average - all years[1]	0.67	1444	0.78	3670	0.85	1520

Note. Highest mean scores are underlined and are statistically significant.

[1] Based on best two years to eliminate bias of low mean score.

Sources: From 1972-73 and 1973-74 Title I Evaluation Reports.

Table 35. Reading - Longitudinal Gains for 1973-74 through 1974-75

Supplier Contractor	1973-74 Grade 1 - posttest	1974-75 Grade 2 - posttest	Gain	1973-74 Grade 2 - pretest	1974-75 Grade 3 - posttest	Gain
D.C. Heath	1.45	2.57	1.12	1.42	2.88	1.46
McGraw-Hill	1.45	2.64	1.19	1.46	3.21	1.75
Random House	1.60	2.50	0.90	1.41	3.21	1.80

Note. Highest scores are underlined and are statistically significant.

A longitudinal analysis was also carried out taking first and second graders in 1972-73 and 1973-74 and comparing their results in subsequent years. The analysis is not based on matched samples (which would have been desired) as data was not available to indicate which students were in the same CP reading program from year to year. In fact, examination of the number of students served for each year (Table 34) suggests substantial changes in the student populations served by each program. Nonetheless, the results are useful in comparing the long term impact of the CP reading programs.

Results for the two-year period (1973-74 and 1974-75) shown in Table 35 support the findings of the cross-sectional analysis in Table 34 with McGraw-Hill showing the largest gain from 1973-74 grade 1 posttest to the 1974-75 grade 2 posttest and Random House showing the largest gain from the 1973-74 grade 1 pretest to the 1974-75 grade 3 posttest. (Comparison of 1972-73 with subsequent years is not included in this analysis as Random House was not started on time in that year and major changes were made in the number of students served for D.C. Heath and Random House over the three-year period.)

In general, the results indicate that McGraw-Hill and Random House are both acceptable reading programs, while D.C. Heath is questionable. D.C. Heath's performance in the third grade is marginal, showing a decline in performance between 1973-74 and 1974-75. Although D.C. Heath's performance in the second grade is acceptable, it does not hold the highest position in either grade, and its poor showing in grade 1 raises further questions.

Mathematics

The results for CP mathematics programs are presented in Tables 36 and 37. There appears to be little basis for selecting one program over the other based on the standardized test results. All programs achieve at least an .80 grade equivalent gain in grades 2 and 3. Addison-Wesley (Table 36) has the highest gain in grade 2 for 1974-75; the second highest average gain for grade 2 for both years; and the second highest gain in grade 3 for 1973-74. D.C. Heath has the highest average gain in grade 2 and is about equal to Addison-Wesley in grade 3 (average gain.) Random House has the highest average gain in grade 3 and the lowest average gain in grade 2.

Table 36. Mathematics - Grade Equivalent Results by Grade and Year

	Addison-Wesley		D.C. Heath		Random House	
Grade & year	Grade equivalent	Students served	Grade equivalent	Students served	Grade equivalent	Students served
Grade 1 - Post						
1972-73	No Data		No Data		No Data	
1973-74	1.65	1380	1.45	1800	1.54	1300
1974-75	1.82	1060	1.78	1480	1.77	1160
Average - all years	1.72	2440	1.60	3280	1.65	2460
Grade 2 - Gains						
1972-73	Not Used		1.00	3180	Not Used	
1973-74	0.82	1040	0.94	1920	0.81	1320
1974-75	1.00	1040	0.97	1200	0.87	1220
Average - all years	0.91	2080	0.98	6300	0.84	2540
Grade 3 - Gains						
1972-73	Not Used		0.90	840	Not Used	
1973-74	0.99	1420	1.09	1380	1.01	1120
1974-75	0.96	1420	0.90	1280	1.15	1200
Average - all years	0.98	2840	0.97	3500	1.08	2320

Note. Highest mean scores are underlined and are statistically significant.

Sources: From 1972-73 and 1973-74 Title I Evaluation Reports.

Table 37. Mathematics - Longitudinal Gains for 1973-74 through 1974-75

Supplier Contractor	1973-74 Grade 1 - posttest	1974-75 Grade 2 - posttest	Gain	1973-74 Grade 2 - pretest	1974-75 Grade 3 - posttest	Gain
Addison-Wesley	1.65	2.66	1.01	1.57	3.46	1.89
D.C. Heath	1.45	2.63	1.18	1.55	3.40	1.85
Random House	1.54	2.52	0.98	1.51	3.65	2.14

Note. Highest mean scores are underlined and are statistically significant.

The results of the longitudinal analysis show similar results with D.C. Heath showing the largest gain from the 1973-74 grade 1 posttest to the 1974-75 grade 2 posttest, and Random House showing the largest gain from the grade 2 pretest in 1973-74 to the grade 3 posttest in 1974-75. Addison-Wesley holds a favorable second place in each grade.

COST EFFECTIVENESS

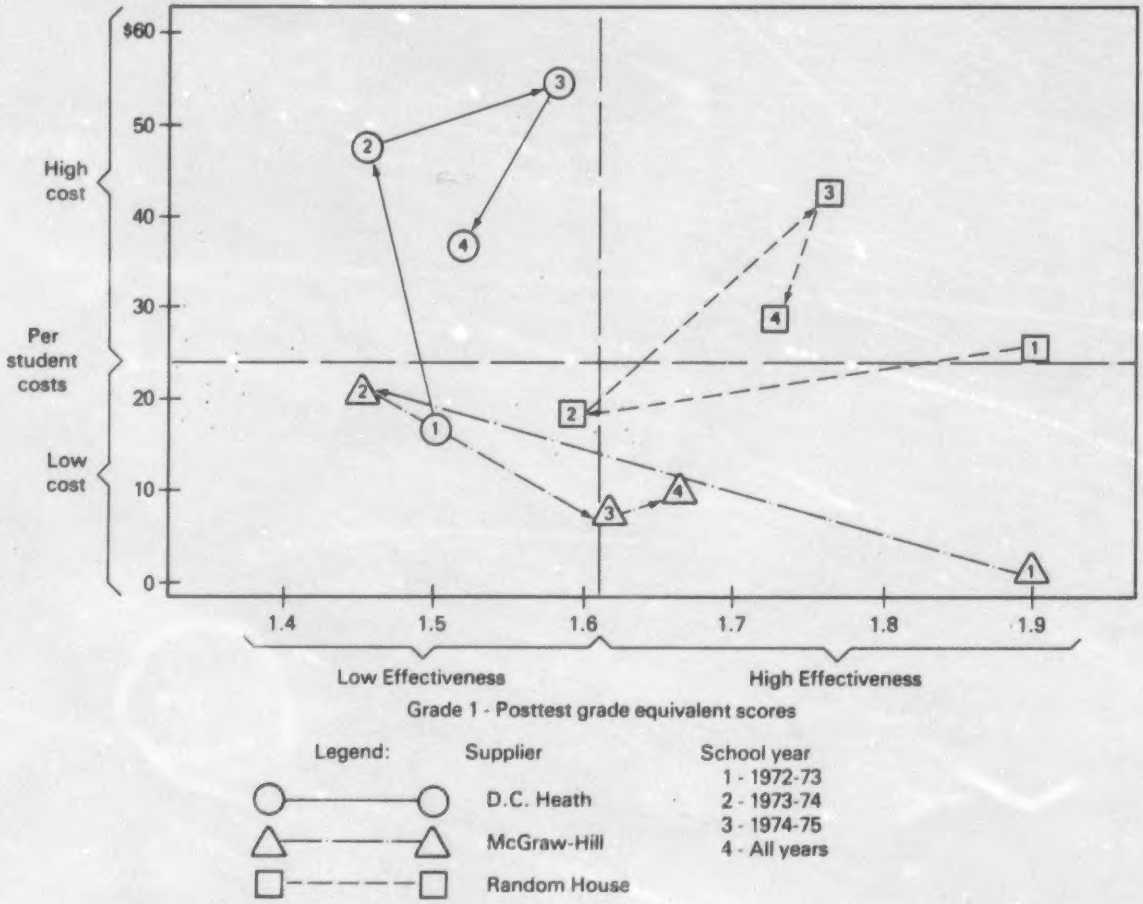
Cost Effectiveness Ratios

Cost effectiveness (C/E) ratios in education must be examined with considerable caution. The problem in interpreting C/E ratios arises in those cases in which it is most desirable to maximize effectiveness with less consideration given to costs. Such is the case for the educationally disadvantaged students served by the ESEA Title I program. The primary concern is to maximize achievement in reading and mathematics rather than reduce costs by a few dollars. Reliable differences of ½ month or more grade equivalent gain are quite important in overcoming achievement deficits for Title I students.

The interpretation of C/E ratios can be considered by examining the ratios in terms of four groups:

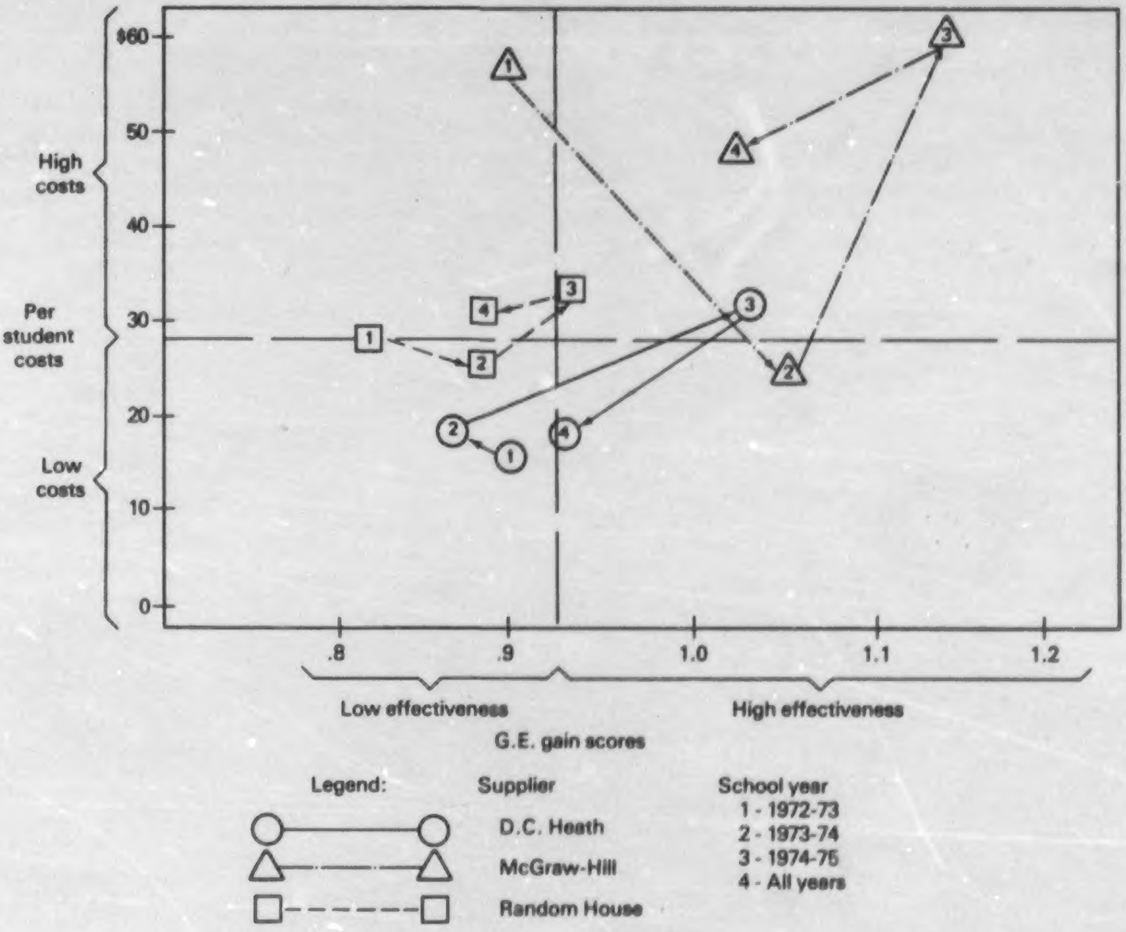
1. High effectiveness — low costs
2. High effectiveness — high costs
3. Low effectiveness — low costs
4. Low effectiveness — high costs

The groups are listed in order of their acceptability. High costs coupled with high effectiveness are more acceptable than low effectiveness irrespective of costs. The graphic results in the data that follow (Figures 7 through 12) brings out these relationships more clearly.



[1] Cost data obtained from Table 38.

Figure 7. Graphic presentation of cost effectiveness data[1] (Reading programs - Grade 1)



[1]Cost data obtained from Table 38.

Figure 8. Graphic presentation of cost effectiveness data[1] (Reading programs - Grade 2)

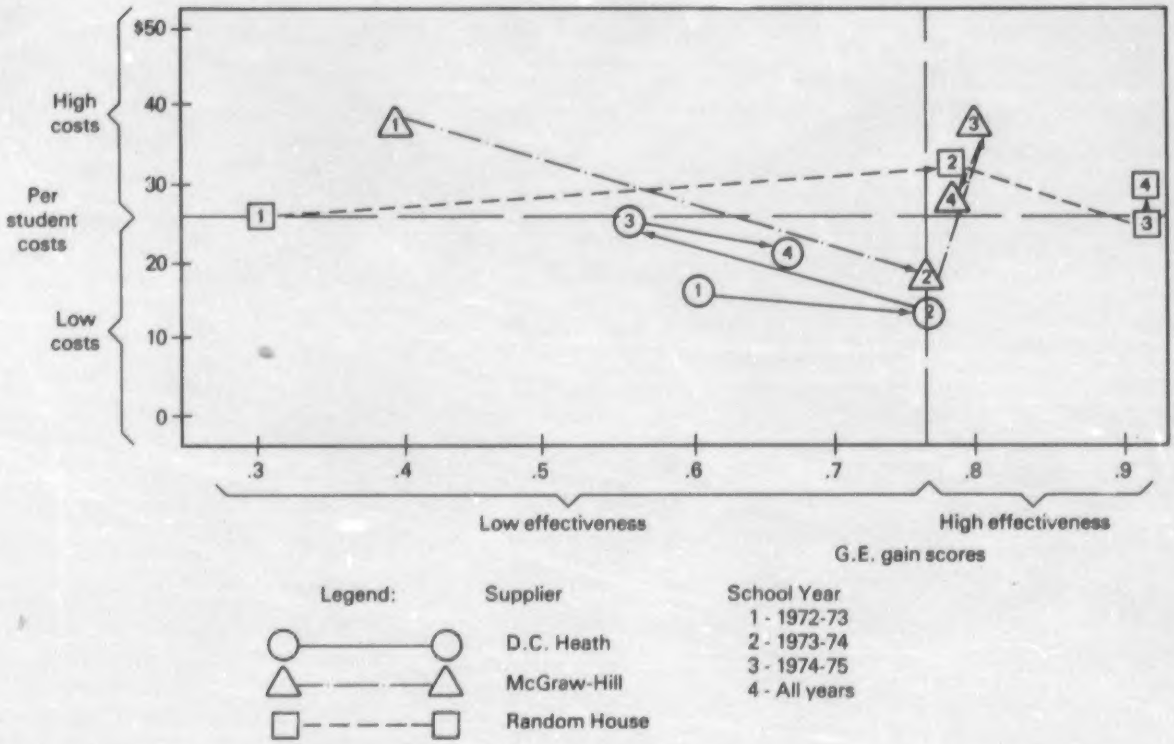
CP Reading Programs. As indicated earlier in this report, D.C. Heath had the lowest per student costs while McGraw-Hill's costs per student were the highest. On the other hand, D.C. Heath had the poorest gain scores in grade 3, particularly in 1973-74. The results are presented in Table 38 and in Figures 7 through 9 showing the per student costs for instructional materials, posttest scores for grade 1 and the gain scores for grades 2 and 3, and the cost effectiveness ratio. Per student costs for instructional materials was used as the cost measure, as staff development costs were not obtained by grade. The staff development costs do not contribute a great deal to the total cost picture (see Tables 32 and 33) and would not have an impact on the overall results.

It should be noted that D.C. Heath is the most expensive in the first grade while showing the poorest results in terms of posttest results; in grade 2, D.C. Heath has the lowest costs and has acceptable gain scores; in grade 3, in 1974-75 costs are high, but the gain scores are low.

McGraw-Hill in grade 2 has the highest gains but also the highest costs (except for 1973-74.) In grade 3 in 1974-75 McGraw-Hill has the highest costs.

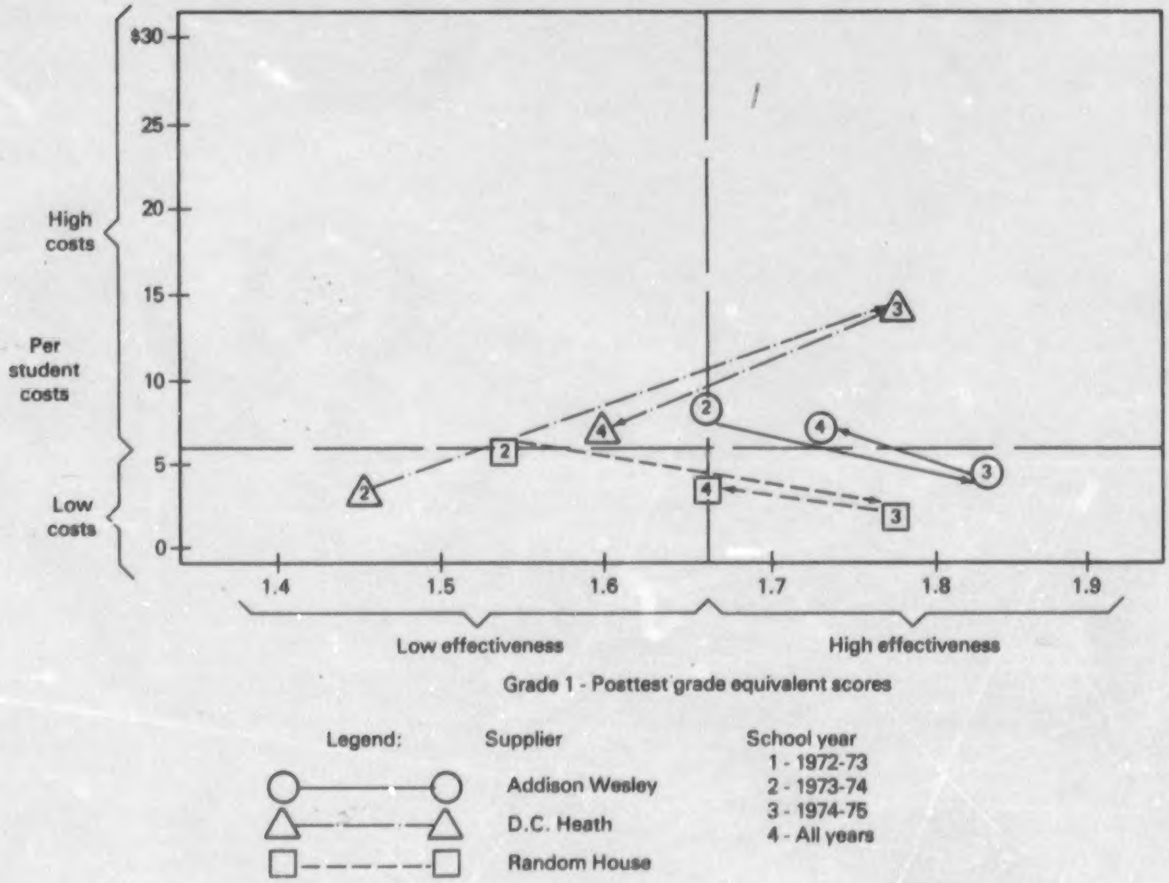
Random House has more moderate costs particularly in grade 3 in 1974-75, the same period in which it had the highest gain scores.

The evidence shows mixed results when both costs and effectiveness are taken into consideration. However, we are inclined to give more weight to effectiveness differences in formulating recommendations. For this reason, D.C. Heath's poor showing in the third grade is an overriding factor in our recommendation to retain only the McGraw-Hill and Random House reading programs. A second alternative is to place a heavier investment in Random House in grades 1 and 3, and in McGraw-Hill in grades 1 and 2. D.C. Heath materials might be redistributed to grade 2.



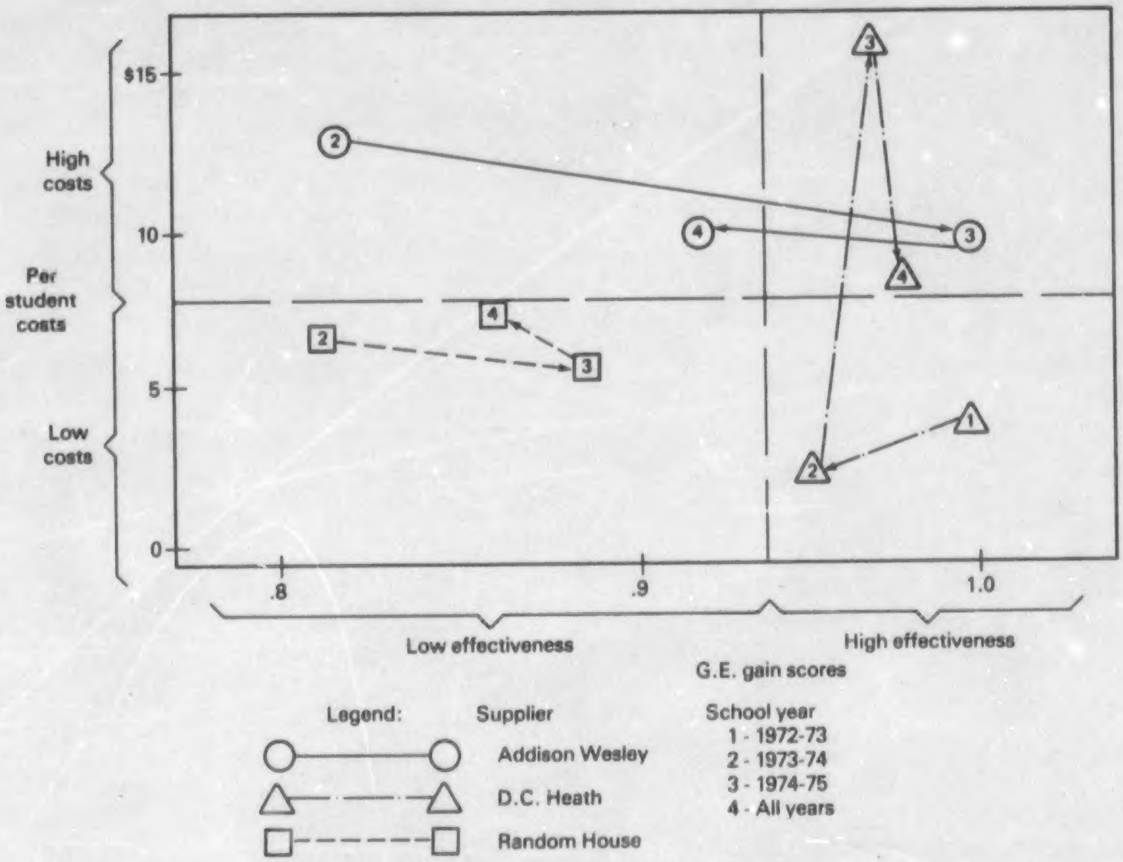
[1]Cost data obtained from Table 38.

Figure 9. Graphic presentation of cost effectiveness data[1] (Reading programs - Grade 3)



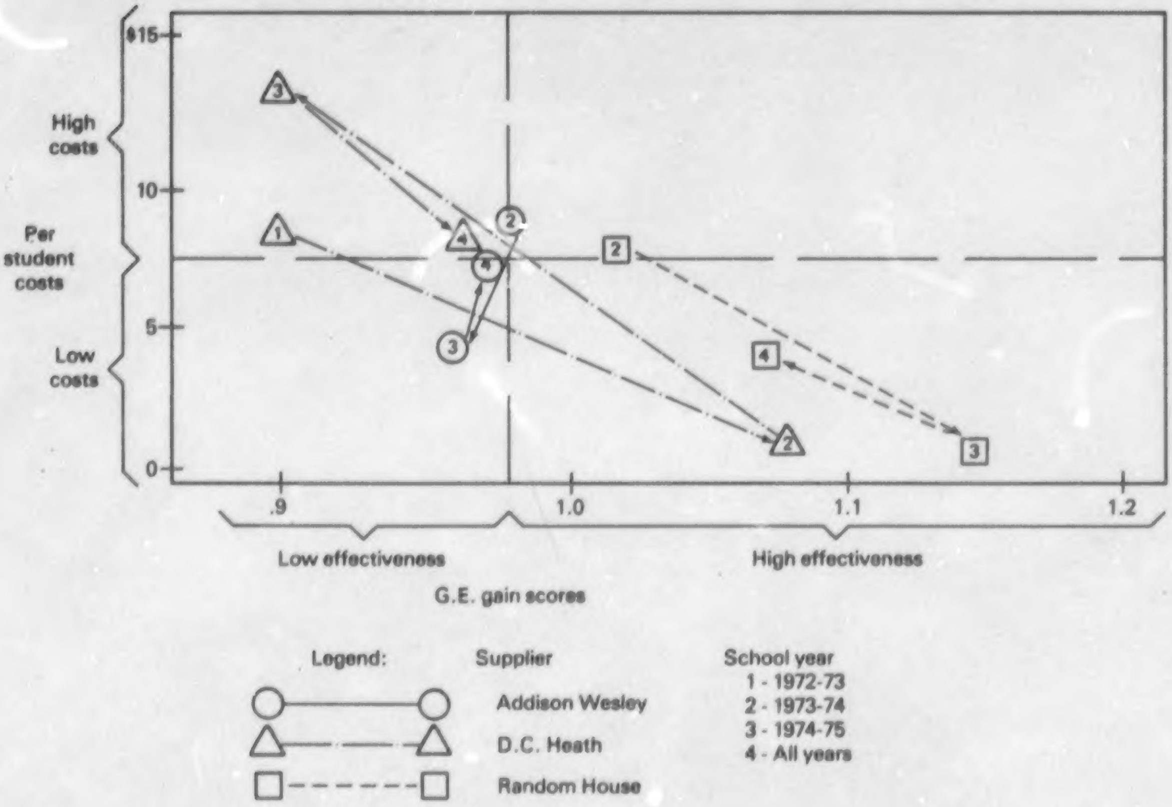
[1]Cost data obtained from Table 39.

Figure 10. Graphic presentation of cost effectiveness data[1] (Mathematics programs - Grade 1)



[1] Cost data obtained from Table 39.

Figure 11. Graphic presentation of cost effectiveness data[1] (Mathematics programs - Grade 2)



[1] Cost data obtained from Table 39.

Figure 12. Graphic presentation of cost effectiveness data[1] (Mathematics programs - Grade 3)

Mathematics CP Programs. The results in Table 39 and in Figures 10-12 show little to commend one mathematics program over the other. As indicated earlier, in grades 2 and 3 all programs achieved grade equivalent gain scores of .80 or higher.

Year-to-year trends are also worth examining. In grades 1 and 2, all programs improved their gains between 1973-74 and 1974-75, while in grade 3 gain scores declined for Addison-Wesley and D.C. Heath, but increased for Random House in the same period. Cost trends show a marked reduction in per student costs and cost effectiveness ratios for Addison-Wesley and Random House from 1973-74 but a marked increase in per student costs for D.C. Heath. Although Addison-Wesley has the highest average per student cost and cost effectiveness ratios (for both years) in grades 1 and 2, its high grade equivalent performance and low costs in grades 1 and 2 in 1974-75 indicate that it should be retained. Random Houses's top performance in grade 3, in terms of high gains, low costs, and favorable cost effectiveness ratio dictates its retention. The marked increases in per student costs for D.C. Heath between 1973-74 and 1974-75, and its drop in gain scores in grade 3, raises some questions about the continuing viability of this mathematics program. However, cost negotiation with the publisher may prove fruitful in limiting cost increases and maintaining an acceptable cost effectiveness ratio. Otherwise, funds could be more effectively channeled into the Addison-Wesley and Random House programs.

Table 38. Reading: Costs and Effectiveness by Grade and Year

Grade and year	D.C. Heath			McGraw-Hill			Random House		
	Per student costs[1]	Grade equivalent[2]	C/E ratio	Per student costs[1]	Grade equivalent[2]	C/E ratio	Per student costs[1]	Grade equivalent[2]	C/E ratio
Grade 1									
1972-73	18.16	1.50	12.11	0.90	1.90	0.47	21.80	1.90	11.47
1973-74	47.91	1.45	33.04	20.37	1.45	14.06	18.17	1.60	11.36
1974-75	54.23	1.58	34.32	9.74	1.64	5.94	41.43	1.76	23.54
Average all years	36.87	1.51	24.42	9.89	1.67	5.92	27.89	1.72	16.22
Grade 2									
1972-73	18.65	0.90	20.72	55.03	0.90	61.14	27.91	0.80	34.89
1973-74	18.68	0.88	21.23	22.13	1.04	21.28	26.50	0.89	29.78
1974-75	31.43	1.03	30.51	61.85	1.12	55.22	33.27	0.93	35.77
Average all years	22.31	0.93	23.99	47.07	1.01	46.60	29.47	0.89	33.11
Grade 3									
1972-73	19.63	0.60	32.72	37.92	0.40	94.80	28.24	0.30	94.13
1973-74	14.85	0.77	19.29	18.68	0.77	24.26	30.38	0.78	38.95
1974-75	27.64	0.57	48.67	39.25	0.80	49.06	28.96	0.91	31.82
Average all years	20.34	0.67	30.36	28.97	0.78	37.14	29.27	0.85	34.44

[1] Per student costs for instructional materials from Table 30.

[2] Grade equivalent from Table 34.

Table 39. Mathematics: Costs and Effectiveness by Grade and Year

Grade and year	Addison-Wesley			D.C. Heath			Random House		
	Per student costs[1]	Grade equivalent[2]	C/E ratio	Per student costs[1]	Grade equivalent[2]	C/E ratio	Per student costs[1]	Grade equivalent[2]	C/E ratio
Grade 1									
1972-73	—	—	—	—	—	—	—	—	—
1973-74	8.93	1.65	5.41	4.17	1.45	2.88	5.68	1.54	3.69
1974-75	5.33	1.82	2.93	13.65	1.78	7.67	3.82	1.77	2.16
Average all years	7.37	1.72	4.28	6.92	1.60	4.32	4.81	1.65	2.92
Grade 2									
1972-73	—	—	—	4.73	1.00	4.73	—	—	—
1973-74	12.65	0.82	15.43	2.52	0.94	2.68	6.04	0.81	7.46
1974-75	7.04	1.00	7.04	15.26	0.97	15.73	5.21	0.87	5.99
Average all years	9.84	0.91	10.81	6.06	0.98	6.18	5.64	0.84	6.71
Grade 3									
1972-73	—	—	—	8.09	0.90	8.99	—	—	—
1973-74	9.46	0.99	9.56	2.21	1.09	2.03	7.43	1.01	7.36
1974-75	4.94	0.96	5.14	13.16	0.90	14.62	1.78	1.15	1.55
Average all years	7.20	0.98	7.35	7.62	0.97	7.86	4.51	1.08	4.18

[1] Per student costs for instructional materials from Table 31.

[2] Grade equivalent from Table 36.

CHAPTER XII. ADMINISTRATION AND SUPPORT SERVICES

The evaluation of administration and support services of the District of Columbia Title I program has two major components which will be covered in this chapter. They are (1) effects of management within schools, and (2) implementation of support services within schools.

MANAGEMENT

A random sample consisting of 16% of the Title I schools was selected for the management evaluation. Within these schools, principals and educational aides were interviewed to evaluate the implementation of the Title I instructional program and to make recommendations for revision of the program.*

Table 40 presents the total number of in-school staff who worked with Title I students. A detailed breakdown of Title I staff is included together with principals and classroom teachers who worked with Title I students but who were not members of the Title I staff. Note that Title I staff may have been assigned to more than one school.

Table 40. Number of In-school Staff Who Work With Title I Students

Classification	Total
Title I Staff	
Reading Teachers	65
Mathematics Teachers	62
Educational Aides	311
Other Pupil personnel workers (36) Psychiatric-social workers (6) Clinical psychologists (6) Pupil personnel aides (25) Health Aides (–)	73
Non-Title I Staff	
Principals	63
Classroom teachers	853
Total	916

The number of personnel interviewed within each category is given in Table 41. Approximately equal proportions of each staff category were interviewed, with two exceptions. First, the large number of educational aides made interviewing more than a few impractical, and second, the reduced sample of pupil personnel is due to unfilled positions in some schools and to part-time assignments in others.

---

*Resource teachers and classroom teachers were not internviewed. They were participants in the "Teacher's Battery," the results of which are presented in Chapter IX.

Table 41. Number and Percent of Personnel Interviewed

Classification	Total *N*	*N* interviewed	% of Total within type
Title I Staff			
Educational aides	311	16	5
Pupil personnel workers	36	8	22
Psychiatric-social workers	6	1	17
Clinical psychologists	6	1	17
Pupil personnel aides	23	2	9
Health aides	25	4	16
Principals	63	12	19
Total	470	44	9

The results of the interviewing process are presented in the following sections, which cover the reactions of the principals and educational aides.

Principals

The key to the success of the Title I program in the schools is the principal who is the instructional leader and, as such, is responsible for staff recruitment, staff performance, and efficient program implementation. The principals were, therefore, the obvious source for identifying management successes which affected the implementation of instructional and support programs. They also provided recommendations which could influence future revisions.

Successes. The principals were unanimous in their praise of the reading and mathematics resource teachers; they felt that these teachers were able to produce positive results in their students' educational achievement level. Another positive point mentioned was the involvement of concerned and interested parents in the school program. Their services relieved staff for other tasks which resulted in improvement in students' schoolwork and behavior.

Numerous other positive comments about the Title I program were made. Some of them related to the growth in cultural awareness of students as a result of field trips, the additional cooperation among involved teachers, and the increase in educational progress made by the students.

Recommendations. Principals all agreed that the Title I program was worthwhile and beneficial for students, but they did feel that it was possible to make some improvements. The recommendations of the principals for improvement were primarily in the areas of budget, personnel policies, and program implementation. The principals suggested that they be included in the budgeting process; they felt that their inclusion in budget conferences would give them a voice in the distribution of funds and would also provide them with an understanding of the funding process. The principals would particularly like to see funds available at the beginning of the year, in order to assure efficient planning for their use and they also wish to be able to obtain adequate equipment and supplies for the programs.

Several recommendations related to personnel were expressed. The major one had to do with hiring. The principals felt the need to be able to hire new resource teachers or replace those lost to other employment. In schools where there was no Title I Program Assistant, the principals felt that some additional aid was needed in order to complete the required paperwork.

The principals also expressed the need for assistance in dealing with parents whose primary concern appeared to be the stipend. The parents' interests need to be channelled toward giving assistance to students and teachers.

Another recommendation toward the improvement of staff morale was for more consistent services by educational aides and more school staff understanding of Title I operations. They recommended, in addition, provision for materials and fiscal support when needed.

The third area of recommendations concerned program implementation; major suggestions were related to staff development. The principals feel that programs need to be scheduled so as not to require release time which takes teachers away from students during school hours.

A variety of other suggestions were mentioned by the principals. These were:

1. The funding of pupil personnel services needs to be reviewed in order that full-time positions not be filled on a part-time basis;
2. Equipment and supplies should be delivered as scheduled;
3. All children who are eligible for the program should be offered the opportunity to participate;
4. More money should be provided for clothing;
5. Guidelines should be established to insure the availability and attendance of educational aides;
6. Money should be used to fund more student cultural experiences rather than to fund more jobs for adults;
7. The program should be funded for another five years to assure better implementation;
8. An educational aide should be provided for each teacher;
9. Consultants should be available at the beginning of the school year for provision of technical assistance;
10. A psychologist should be available a minimum of two and one-half days per week;
11. The Competitive Partnership program should be continued.

Educational Aides

The educational aides were also seen as integral to the success of the Title I program. Their published responsibilities are described below:

> Educational aides will perform a variety of functions, relieving the teacher of many necessary but time-consuming tasks. Daily activities may include reading stories, preparing flash cards or word games, administering teacher-made tests, supervising small-group exercise, assisting, operating audio-visual equipment, maintaining files and recording test scores, escorting children to the auditorium, lavatory or playground, and supervising children on the playground or in the lunchroom. After school, aides provide homework center assistance.

Instructional staff and central office staff needed information regarding the efficacy of this part of the program. Interviews with educational aides provided indications of the successes of the program and recommendations for future revisions.

Successes. The educational aides felt that they had been made aware of the duties established for their position. They also believed in their competence to fulfill these tasks. Evidence of this is provided by their desire to be engaged in the activities outlined in their job description.

Recommendations. Educational aides indicated that their part in the Title I program was beneficial to students and alleviated many problems. Their primary suggestions for revisions related to teacher awareness, size of student groups, and length of contract. The educational aides suggested that the teachers be adequately apprised of the original activities outlined for the aide program. In this way, the Title I students would receive more time and attention in the planned activities. The aides felt that the students would also receive more benefits from the Title I program if the size of the groups with which the aides worked was decreased to a maximum of no more than two students. The last recommendation concerned their twelve-month contract. Since the aides are employed on a full-time basis for twelve months, they are available when students are not in school. Their job description should be revised to include activities appropriate to this time, or the length of the contract should be changed.

SUPPORT SERVICES

The Title I program provides supportive services to alleviate factors which, though beyond the scope of the regular school program, often hamper a student's ability to learn or effectively benefit from educational instruction. Some examples include a student's emotional or physical problems, severe economic and attitudinal limitations within his home and community environment, or a combination of these problems. They can serve to impede his motivation and capacity for "normal" functioning within a school setting. In such instances, the regular classroom structure is not sufficient to meet the student's needs, and support services as resources are necessary for optimum academic nurturing.

Some of the major services provided by the Title I program are the Pupil Personnel Services, special projects, and the parent involvement corps. Each of these services, with criticisms and recommendations, are discussed in this chapter.

Pupil Personnel Services

Pupil Personnel Services, a Title I program, is responsible for providing a diversified range of support services for specifically identified Title I students and their families. The employees in this program have special skills, knowledge, training, and expertise. These attributes enable them to work with and through the school, home, and community in an effort to help students work around obstacles to their learning. Getting and keeping parents and community members involved with the school is essential to the program's success.

The foundation of the program, however, rests in the direct one-to-one help for the student. The type of assistance can vary from the simple to the complex, depending upon the student's need. An analysis of such needs indicates that help is often required in six major areas: academics, attendance, economics, behavior, family problems, and health. Members of the pupil personnel teams must confer regularly with principals, teachers, counselors, and parents in order to identify specific needs and problems of individual students. The team members then work cooperatively to develop and use all available resources to resolve the student's difficulty.

The District of Columbia Public School System is decentralized into six regions. Each of the three assistant directors coordinates two city regions under the supervision of the director, who is also responsible for coordinating pupil personnel services with the other components of the Title I Comprehensive Program. Pupil personnel staff includes four categories of experts: clinical psychologists, psychiatric social workers, pupil personnel workers, and pupil personnel aides.

The clinical psychologists provide assistance in analyzing and making prescriptive recommendations in areas of growth and development, behavior modification, test interpretation, and student profiles. They also help the classroom teacher in differential and developmental assessment of learning and emotional problems. The psychiatric social workers provide expertise mainly in the area of parental involvement. They use all available resources in support of objectives of the Title I program.

The pupil personnel workers provide daily support, counseling and guidance to students in the areas of health, economic needs, absenteeism, and domestic problems as they affect educational growth. They are the school-home-community liaison. The pupil personnel aides also assist in the above service. In addition to counseling and guidance directed toward personnal problems, the pupil personnel workers and aides must often see that a child and his family obtain basic essentials for minimal existence such as food, clothing, shoes, and furniture. Good working relationships must be established with community businesses if these basic daily needs are to be met.

A small sample of the pupil personnel staff was interviewed at the schools, and evaluators also met with the supervising director and the three assistant directors. The pupil personnel staff were questioned about the effectiveness of the Title I program; their subjective evaluations in the interviews produced a set of recommendations which collectively can serve to better the overall administration of the program.

One recommendation for improving management was to have better communication between the Title I coordinators, school administrators, and pupil personnel. There were too few meetings between coordinators and actual workers; therefore, school administrators were unclear as to how to use the services of the personnel workers in the most effective way. Two other criticisms were that psychologists and social workers were not available often enough to the students, and supplies were not available when needed.

Another recommendation from the pupil personnel staff to improve the general management of the pupil personnel services was for more specific instructions for following Title I guidelines. More available media and individualized instructional materials also are needed. Psychologists and social workers should be available to every school a minimum of one day weekly. The supplies needed by the pupil personnel staff should be available at the beginning of the school year to meet the needs of the students.

Some inservice recommendations were to gear training to meet the needs of individuals in such various fields as health, the classroom setting, and the community. It was felt a plan should be developed to offer specific courses in such helpful areas as child development, urban studies, and human behavior. Training sessions for the pupil personnel staff should be held prior to the opening of school and be continued throughout the school year.

Regarding the school budgeting process, the pupil personnel staff recommended that more funds were needed to operate their program, specifically emergency funds for food, clothing, and medical care. The staff should have input into the budget process, and they desire a wider distribution of literature and information concerning budget and funds.

The pupil personnel staff recommended better coordination with teachers whose students were involved in the Title I program. These recommendations include: (1) delineation of job responsibilities for teachers and pupil personnel staff; (2) regularly scheduled conferences between teachers and pupil personnel workers; and (3) early identification by the teacher of individual student needs. It was further recommended that case conferences include the mathematics and reading resource teachers when possible.

Pupil personnel workers recommended the elimination of the bureaucratic red tape in obtaining emergency assistance from outside agencies. It was also felt that a mechanism needs to be established for more contact with the working parent around the child's needs.

In conclusion, all the pupil personnel staff agreed that the Title I program was worthwhile and that it was needed in all schools from kindergarten to sixth grade. Despite some administrative problems, pupil personnel services envision their role as a vital component in the Title I comprehensive program which needs to be continued and expanded.

Parental Involvement

The parental involvement component of the Title I program follows the successful pattern of the parental involvement components of community action child development projects such as Head Start and Follow Through. Title I parental involvement was made a legal requirement of Title I in 1970 and is based upon the community action model which has demonstrated that parents can generate resources and modify instruction to make them more responsive to the needs of their children.

The goal for parental involvement in Title I is to enhance the educational opportunities of their children. The impact of each parent's individual effort is greatly strengthened through the system of Parent Advisory Councils, through which parents can help groups within the community work together. In the process, they become familiar with people, policies, and procedures of the school system and other institutions which operate in their community. The goal of enhancing the educational opportunities for children in a Title I program is supported, to a large extent, by the interest of individual parents who desire to see their children succeed in school.

The local D.C. parental involvement effort is a highly structured comprehensive program organized through the required Parent Advisory Councils at the system-wide and local school levels. Although local councils or committees were only recently required by national Title I regulations, the D.C. program already had active local councils. There were four ongoing programs for parental involvement during the 1974-75 school year, and they are described below.

1. The Parent Partner Volunteer Corps consisted of 300 parents who volunteered their services directly to the classroom and received a small stipend to cover the cost of babysitting or other expenses incidental to their participation. This stipend was not to be misconstrued as a salary, but rather, allowed for a greater level of parent participation.

2. TOPPS Chorus was a singing group that met regularly and performed at parent and community functions. Their purpose was to provide a vehicle for self-expression and for the development of self confidence in parents, by providing a sense of pride in their families. Their efforts provided parent and community groups with a valuable resource in programming.

3. The AT-HOME Project was a pilot project which provided parents with kits of instructional materials for use with their children.

4. Three workshops were conducted this past year for the purpose of parental training. One workshop was conducted by the publishers of the Competitive Partnership materials. Another trained the

Parent Partner Volunteer Corps and a third dealt with a series of topics of interest to all parents such as Title I budgeting, child development, and media.

An annual conference was held at the end of the regular school year to integrate and summarize the functions of the various parental involvement activities.

Overall planning, monitoring, and evaluation of the parent activities and all other aspects of the Title I project were managed through the Parent Advisory Council system. The Parent Involvement Coordinator oversaw all parent activities, with the help of a small staff. All school personnel, particularly the pupil personnel staff, worked at the school level to involve parents in the educational process and to develop the kind of support and outreach needed for a compensatory education program.

The level of parental involvement was measured by examining the parental attendance records at the office of the Parent Involvement Coordinator and by a questionnaire administered to delegates of the Citywide Parent Advisory Council who attended the regularly scheduled March meeting. Participation was measured in three categories: (1) the Citywide Parent Council, (2) Regional Councils, and (3) Conference Committees. It was found that Title I parent participation numbered 1,020, with 379 parent participants at four city-wide Parent Council meetings, 441 parent participants at 22 Regional Councils, and 200 parent participants at 17 Conference Committees. The total participation figure (1,020) does not represent that exact number of individuals, but accommodates the parents who attended council or committee meetings on a more frequent basis.

Workshop participation was measured in three categories; (1) Publishers' Workshops, (2) Parent Partner Training, and (3) other workshops. Title I parent participation numbers 645 in these twenty-one workshops. The Publishers' Workshops reported 123 parent participants in six workshops, 256 parent participants were recorded in the four Parent Partner Training sessions and there were 266 parent participants in the 11 other workshops. Once again, multiple participation by some parents reduces the actual number of individual parents who attended these workshops.

Table 42. Parental Involvement in Workshops

Type	Number of Workshops Held	Total Attendance
Publisher's Workshop	6	123
Parent Volunteers	4	256
Child Development and Instruction	11	266

A comparison with 1973-74 parental involvement shows an increase in participation in all types of parent meeting and workshop activities. The most marked gains were in workshop attendance for the Parent Partner Volunteers (up 25%), in attendance at Council meetings (up 24% for city-wide and 29% for regional), and in attendance at general school activities not related to Title I (up 21%). Such increases would seem to substantiate the success of the Parent Involvement Program.

Principals, pupil personnel staff, and educational aides were asked to comment on parental involvement. Those principals who were interviewed desired more outreach efforts for parents, feeling too few were involved. Pupil personnel staff noted a lack of skill on the part of all staff in communicating with parents and a lack of guidance on the part of administration to define proper roles for parents in classroom activities. Both of these shortcomings, they felt, made it difficult to challenge competent parents who would help if they were properly instructed and supervised on the job. Educational aides who were interviewed felt that more participation of parents would help facilitate their own jobs.

Specific recommendations from principals, personnel staff, and aides for improved quality of parent involvement were (1) to have stipends for parents, regardless of how small, as an incentive for involvement, (2) have more training for parents involved in the Title I program, (3) provide more clearly defined parental duties and responsibilities, (4) have social activities after school hours for parents and school personnel, (5) increase the use of parents as tutors and chaperones, and (6) make a concentrated effort to recruit parents for school activities.

In summary, the Parent Involvement Program is providing a mechanism in which parents can become involved in the immediate problem of educating their children. The parents' interest in school activities, and in long range problems pertaining to community development, as well as educational progress, is enhanced by their participation in the Parent Involvement Program. The outreach effort could be improved to an even greater extent through a more comprehensive staff-parent cooperative training program based upon the recommendations of this report.

CHAPTER XIII. NONPUBLIC SCHOOLS

PROGRAM DESCRIPTION

By legislative mandate, children attending nonpublic schools in the District of Columbia qualify for participation in the Title I program. Their participation is contingent on educational deprivation and residency in a geographic area of the city which is designated as a Title I project area. Two public school coordinators working with nonpublic school officials are responsible for determining the educational need of children residing within the designated attendance areas. The selection of eligible children is subject to change as eligible public school attendance areas change.

The Title I regulations stipulate that:

> Each local education agency shall provide special educational services designed to meet the special educational needs of educationally deprived children residing in its district who are enrolled in private schools. Such educationally deprived children shall be provided genuine opportunities to participate therein consistent with the number of such educationally deprived children and the nature and extent of their educational deprivation.

In the District of Columbia, nine nonpublic schools participate in the Title I program. They are Immaculate Conception, Holy Name, St. Teresa, Holy Redeemer, St. Martin, Holy Comforter, Sts. Paul and Augustine, Our Lady of Perpetual Help, and St. Peter.

The emphasis of the Title I program, as articulated by the District of Columbia school system, is founded on an assessment of needs. The program emphasis is on the development of the basic skills in the areas of reading, written and oral communication, and mathematics. Instruction is based on the diagnostic/prescriptive approach and is skills-oriented using the most appropriate curriculum materials and media available. Skills development is individually prescribed; attention is given to the use of standardized and informal diagnostic tests, learning styles, relevant instructional materials, and skills application. The accent is placed on each child's individuality, the instructional climate attempting to promote personal development, and success.

A survey of nonpublic Title I schools indicates that 1,029 children in grades one through eight qualify for participation in the Title I program. These children are served by seven reading resource teachers and six mathematics resource teachers. Of these thirteen resource teachers, one reading and one mathematics teacher serve more than one nonpublic school.

Nonpublic schools followed two main objectives set by the Title I Program Office. The first of these two objectives states that after seven months of instruction, identified Title I students will demonstrate a mean gain of one year in reading and mathematics as measured by standardized tests. The second objective states that by the end of the regular school year, 75 percent of the identified students will have demonstrated improved attitudinal changes and increased interests in learning activities, as identified by an evaluation instrument developed by an outside contractor. These two objectives guided the instruction in the nonpublic schools during the 1974-75 school year.

Table 43 examines the scores on Total Reading and Total Math of nonpublic School Title I students. For grades 2, 3, 4, 5, 6, 7, and 8 pretest, posttest, and gain scores are reported at each grade level in grade equivalent. The grade equivalent gain scores for reading and math, second grade level, are consistently at or above the normal gain of eight months. In short, second grade, nonpublic school Title I students are reducing the achievement disadvantage with which they enter the program. Grade equivalent gain scores in reading and math for third grade show a slight decline in math and a rise in reading over the scores reported for second graders. The math scores show about a month's gain for every month and a half of instruction, while the reading scores show better than a month's gain for every month of instruction.

Fourth grade gain scores in reading and math show a month's gain for every month and a half of instruction. As can be seen, the nonpublic school Title I student starts fifth grade more than a year and a half off the norm, and by the end of the year the disadvantage has remained about the same in reading and math. Although the sixth grade nonpublic school Title I student gained twelve months in reading and eleven in math, he is still better than a year off of grade level. The seventh grade student gained fifteen months in reading for ten months of instruction and eight months in math for ten months of instruction. When the eighth grade nonpublic Title I student enters the fall term, the disadvantage has increased in both reading and math. Because the Title I eligibility roster is reestablished each year, it is possible that the loss in percentile scores across the grades simply reflects the constant reshuffling of the Title I eligibility roster. However, it is also possible that the loss in receding scores across the grades (except for sixth and seventh grades) is the product of the "cumulative deficit" phenomenon often observed in Title I program evaluations. A determination as to whether the deterioration process is due to constant restructuring of the group served or represents a real cumulative deficit pattern requires a longitudinal design. The authors strongly recommend that a longitudinal multiyear follow-up study be undertaken as recommended to the public schools.

Table 43. Achievement Test Results for Nonpublic Schools

		Total Reading				Total Math		
Grade	*N*	Pre	Post	Gain (mos.)	*N*	Pre	Post	Gain (Mos.)
2	118	1.3	2.3	10	72	1.7	2.5	8
3	36	2.1	3.2	11	20	2.5	3.1	6
4	45	2.8	3.9	9	58	3.1	3.9	8
5	42	3.8	4.8	10	51	3.4	4.6	12
6	32	4.7	5.9	12	70	4.2	5.1	11
7	35	5.0	6.5	15	40	3.1	5.7	8
8	18	5.3	6.3	10	15	5.8	6.2	4

METHODOLOGY

After meeting with the nonpublic Title I coordinators and the principals, concerning evaluation, it was determined that the evaluation of the nonpublic school Title I program would include principals, resource teachers and nonteaching personnel. Two specific interview instruments were developed for principals and aides: an Interview Guide for Principals of Title I ESEA Nonpublic Schools, and an Interview Guide for Non-Teaching Title I ESEA Personnel in Nonpublic Schools. The Teacher Process Battery which was used in the public schools was also administered to resource teachers in the nonpublic schools in order to obtain comparable evaluation data between the two.

Our research methodology included interviews with every principal, aide, and resource teacher. A schedule was worked out with the nonpublic school principals and Title I Program Coordinator so that all identified personnel participated.

A field interviewing team visited each nonpublic school. Each team was composed of two members who had administered the Teacher Process Battery, principal, and nonteaching aide interviews in the public schools. The protocol was to confirm appointment with the principal several days in advance of our visit. At the nonpublic schools, the team members would first introduce themselves to the principal and then proceed to interview the principal, aides, and resource teachers. Upon conclusion of the interviews, the team members returned to the principal, clarified any further information needs, and departed.

The data from the interview schedules and teacher process batteries were tabulated and summarized. Prior to preparation of the summary, evaluation staff conducted one final meeting with the Title I program nonpublic school administrative staff in order to review the preliminary findings and to discuss the results of the evaluation with the staff.

A discussion of the evaluation results is presented in two parts. First, the findings from the Interview Guide for Principals of Title I ESEA Nonpublic Schools is presented. Second, the findings from the Interview Guide for Non-Teaching Title I Personnel in Nonpublic Schools is given. Each provides a brief profile of the interviewees in the Title I setting, a summary of suggestions concerning the program, and recommendations set forth by each group for Title I program improvement.

PRINCIPAL INTERVIEWS

All nine nonpublic school principals participated in the evaluation. The principals averaged 22 years of experience in the field of education and 7.6 years in the role of principal. A majority of these principals served in a D.C. Title I school since 1972.

Interviews with these nonpublic administrators revealed a total of 1,029 Title I eligible students in D.C. nonpublic schools this year. The figure is considerably higher than the 800 student estimate projected by the D.C. School System. The entire Title I program in nonpublic schools is staffed by twenty-one full-time persons. Two coordinators supervise seven reading resource teachers, six math resource teachers, and six educational aides.

The principals were asked a number of questions about the administration of Title I activities. It was found that principals spent an average of 18.1 hours each week on Title I-related conferences, meetings, and consultations; 9.5 hours per week spent in conferences with parents of Title I identified students; 3.7 hours per week in meetings concerning only the Title I program; 3.8 hours per week in consultation with Title I resource teachers; and 1.1 hours per week in consultation with Title I pupil personnel, psychologists, or psychiatric social workers.

Principals were asked what positive experiences were encountered in this year's Title I program. Their replies strongly endorsed the program, and they stated that there had been a positive change in pupil attitude toward learning, reading, and participating in academic activities. Principals also mentioned that they witnessed excellent student and resource teacher rapport. Some principals favored concentration of remedial attention in the primary grades. Others favored individualized remedial attention rather than concentration on a large number of students.

Principals, during interviewing, were given 13 possible problem areas and asked to comment upon them. All but two categories (parent involvement and paperwork) were found to be problematic. The most intense negative response was to the Title I budgeting process. Seven out of nine (78% principals commented negatively. Most felt that the nonpublic school budget was inadequate to supply sufficient staff—especially full-time resource teachers, pupil personnel and paid parent volunteers.

A summary of the principals' criticisms concerning the major problem areas follows. Half of the principals had problems communicating with the different Title I administrators. Approximately half of them felt that student selection needed restructuring. They noticed that needy students were not served because their place of residence was outside the designated Title I area. One-third of the principals were critical of the materials and equipment provided their schools. They stated that materials were often late and the equipment antiquated. The principals did feel that the resource teachers provide a worthwhile service. Some other criticisms concerning problem areas were that more classroom space was needed, and staff development programs need to take place after school hours and to include classroom teachers.

The final item asked of the principals concerned recommendations for the improvement of the Title I program itself. The general feeling was that a stronger link should be made between the Title I program and the regular school activities, and that Title I should be more supportive of the total school program. It was suggested that resource teachers and classroom teachers coordinate activities and attend workshop sessions together. There was a feeling that the Title I program needs to benefit all the children in the school, or at least be extended to all children who qualified for Title I benefits.

Other suggested recommendations concerned the budgeting process. More funds were felt to be needed, with improved accounting of Title I funds. More full-time staff, including reading resource teachers and pupil personnel was recommended.

Many principals made recommendations concerning Title I program administration. Tighter controls were felt to be essential, such as an annual evaluation and yearly visitation of Title I program staff by the administrative staff. It was also felt that a nonpublic coordinator would administer more effectively to the nonpublic schools. There was a need felt for a cultural enrichment program to be included in the curriculum.

In summary, the results of the principal's interview is that the Title I program is being very favorably received. The present teaching staff available is felt to be excellent, but increased numbers of personnel are needed. The principals also feel that the students are making progress in upgrading reading, mathematics and general learning skills. The criticisms and recommendations set forth are generally critical of the restrictiveness of the program due to budgetary limitations.

NONTEACHING PERSONNEL INTERVIEW

Six educational aides were interviewed at the nonpublic schools. The aides had an average of 6.7 years of experience in their field and five years experience working with Title I students. One educational aide served two schools, while the other five served only one school. All of the aides held high school diplomas or GEDs. Three aides had taken some college courses; two aides had completed two years of college.

The first question asked of the aides was how they spent their time working with the Title I program. The aides stated that the majority of their time, about 80%, was spent with the students; none of the aides spent any time or had any association with parents of Title I children. A very small percentage, approximately 10% or less, of the aides' time was spent with school personnel. None of the aides spent any time with personnel from other agencies. Report writing and other independent work averaged less than five percent of the aides' time. Some aides stated that they spent up to ten percent of their time on report writing, while others said they devoted no time to report writing. Slightly less than five percent of the aides' time was devoted to staff development or inservice training. The time devoted to tasks of the educational aides varied with the school to which the aides were assigned. Amount of time spent with students was generally the same across schools.

Another question asked of the educational aides was how much time was devoted to actual training during the year. No aides had earned any hours toward an academic degree or certification during the 1974-75 school year. Some aides spent time on staff development activities or inservice training, with an average of nine days being devoted to such training activities and ranging from four to twenty days.

The aides were asked for recommendations concerning increasing their effectiveness on the job. Four categories were offered: Title I management, inservice training, parent involvement activities, and the school budgeting process. The aides were quite vocal on this question, and their recommendations frequently paralleled those projected by the principals of the nonpublic schools.

Recommendations reflected perceptions of inequitable treatment or dissatisfaction with career advancement procedures. The aides exhibited deep concern, motivation, and knowledge about the Title I program and its effect on students and personnel. The balance of responses implied that the educational aides did not just air grievances; rather, they expressed hope for some type of program alteration which would create continuing personal satisfaction. The researchers were favorably impressed with the sophistication of the recommendations set forth by the educational aides.

All six aides made some kind of recommendation under the Title I management category. Suggestions referred to the salary and promotion system for aides. One felt that aides should be promoted, like teachers, on a TSA scale rather than GS. One aide offered a stronger plea for performance recognition and promotion by stating that the present system should undergo revision because it was "degrading" for an educational aide to be unable to surpass a level 4. Another aide said that their salaries were not compatible with the amounts "stated in the book."

Other recommendations made in the management category concerned student selection policies. The aides stated that the criteria for selection should reflect need rather than geographic residence. Also, each nonpublic school should have a full-time aide rather than having one aide serve two schools.

There was strong recommendation for more inservice training in reading, mathematics, and use of materials. Aides felt that they should be included in training sessions held for resource teachers. The aides also commented that in the budgeting process too few funds were allocated for materials and equipment and that materials should be replaced or repaired more often.

Recommendations concerning parent involvement activities were made. Parents of Title I children, it was felt, should attend an orientation session to gain understanding and knowledge of the program. The parents, the aides felt, believed Title I children perceived a stigma rather than a benefit from the program. Most aides had very little or no involvement with parents of Title I students, and more interaction was felt necessary.

The aides were asked to suggest program or management changes which would facilitate their work. Four categories of responses were offered: classroom teachers, resource teachers, parents, and pupils. The responses to this question were thin. Some answers were that the aides should spend more time working with children rather than performing menial tasks assigned by the teachers; parents should receive some kind of training so that they could work with the children to reinforce skills learned from the Title I program; more discipline was needed among students so aides could do a better job. A final comment was that the promotional system for the aides should be changed so that aides would be rewarded for schooling, rather than for years on the job.

In summary, the aides appeared concerned about Title I program operations, its effects on them, and its effects on students and parents. They offered positive recommendations for program changes that reflected their years of experience with the Title I program and in the field of educational assistance.

BIBLIOGRAPHY

Almy, M., E. Chittenden, and P. Miller. 1966. *Young Children's Thinking*. New York: Teacher's College Press. 153 pp.

Bearison, D. J. 1975. Is school achievement enhanced by teaching children operational concepts? In G. I. Lubin, J. F. Magary, and M. K. Poulsen (Eds.) Piagetian theory and its implications for the helping professions. Fourth interdisciplinary seminar, University of Southern California. February, 1974. pp. 235-244.

Brainerd, C. J., and T. W. Allen. 1971. Experimental induction of the conservation of "first order" quantitative invariants. *Psychological Bulletin* 75(2):128-144.

Bureau of the Census, U.S. Department of Commerce. 1970. Statistical abstract of the United States. 81st ed. Washington, D.C.

Brekke, B. W., J. D. Williams, and S. D. Harlow. 1973. Conservation and reading readiness. *Journal of Genetic Psychology* 123(I):133-138.

Cathcart, W. G. 1971. The relationship between primary students' rationalization of conservation and their mathematical achievement. *Child Development* 42(3):755-765.

Figurelli, J. C., and H. R. Keller. 1972. The effects of training and socioeconomic class upon the acquisition of conservation concepts. *Child Development* 43(1):293-298.

Gaudia, G. 1972. Race, social class, and age of achievement of conservation on Piaget's tasks. *Developmental Psychology* 6(1):158-165.

Harper, P. A., L. K. Fischer, and R. V. Rider. 1959. Neurological and intellectual status of prematures at three to five years of age. *Journal of Pediatrics* 55:679-690.

Hurta, M. J. 1972. The relationship between conservation abilities on selected Piagetian tasks and reading ability. Ph.D. Thesis, East Texas State University. 118 pp. *Dissertation Abstracts International* 33A:4941-4942.

Kaminsky, Mildred. 1970. A study of the status of conservation ability in relationship to arithmetic achievement. Ph.D. Thesis, Wayne State University. 103 pp. *Dissertation Abstracts International* 31A:3341.

Kaufman, A. S., and N. L. Kaufman. 1972. Tests built from Piaget's and Gessel's tasks as predictors of first grade achievement. *Child Development* 43:521-535.

Knobloch, H., and B. Pasamanick. 1960. Environmental factors affecting human development, before and after birth. *Pediatrics* 26:210-218.

Knobloch, H., R. Rider, P. Harper, and B. Pasamanick. 1956. Neuropsychiatric sequelae of prematurity — a longitudinal study. *Journal of American Medical Association* 161:581-585.

Meyers, C. E., R. K. Yoshida, and C. J. Genrich. 1975. A symposium of some unheralded parameters of Piaget in the schools. In G. I. Lubin, J. F. Magary, and M. K. Poulsen (Eds.). Piagetian theory and its implications for the helping professions. Fourth interdisciplinary seminar, University of Southern California. February, 1972. pp. 256-268.

Plato, F. C. 1974. An adaptation of Jean Piaget's study of conservation of continuous quantity among lower- and middle-class kindergarten children. Ph.D. thesis, New York University. 128 pp. *Dissertation Abstracts International* 35A:6514.

Raven, R. J., and R. T. Salzer. 1971. Piaget and reading instruction. *The Reading Teacher* 24(7): 638-639.

Rohr, J. A. G. 1973. The relationship of the ability to conserve on Piagetian tasks to achievement in mathematics. Ph.D. Thesis, University of Tennessee. 96 pp. *Dissertation Abstracts International* 34A:2398.

Rothenberg, B. B., and J. H. Orost. 1969. The training of conservation of number in young children. *Child Development* 40:707-726.

Sohns, M. L. 1975. A comparison between certain Piagetian logical thinking tasks and the subtraction ability of first, second, and third grade children. In G. I. Lubin, J. F. Magary, and M. K. Poulsen (Eds.). Piagetian theory and its implications for the helping professions. Fourth interdisciplinary seminar, University of Southern California. February, 1974. pp. 245-255.

Stenner, A. 1972. *An Overview of Information Based Evaluation: A Design Procedure.* Information Based Evaluation Series, Book 1. Arlington, Va. 37 pp.

U.S. Senate Select Committee on Nutrition and Human Needs. January, 1974. Hunger in the Classroom: Then and Now. Committee print. Washington, D.C.

Wiener, G. 1968. Scholastic achievement at age 12-13 of prematurely born infants. *Journal of Special Education* 2:237-250.

Wiener, G., R. V. Rider, W. C. Oppel, and P. A. Harper. 1968. Correlates of low birth weight. Psychological status at eight to ten years of age. *Pediatric Research* 2:110-118.

Wiener, G., R. V. Rider, W. C. Oppel, L. K. Fischer, and P. A. Harper. 1965. Correlates of low birth weight. Psychological status at six to seven years of age. *Pediatrics* 35:434-444.